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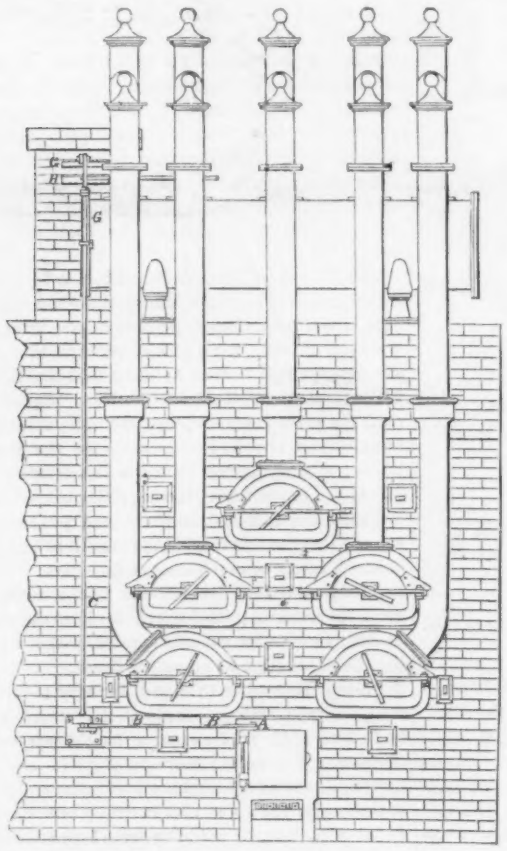
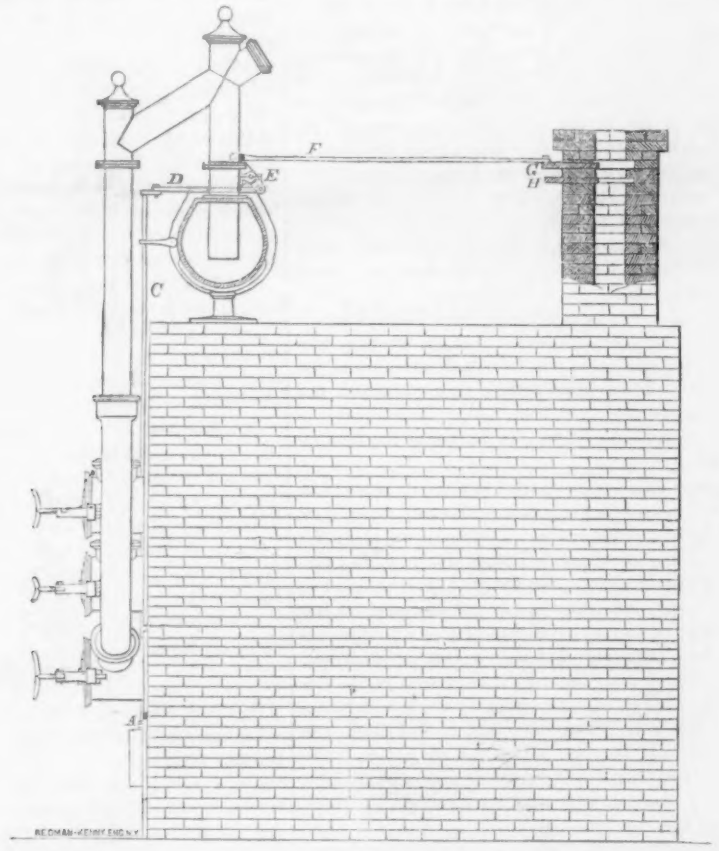
Patent Damper Arrangemtnt.

We have received from Mr. Francis Carroll, manager of the New Orleans Gas Works, the following description of his patent damper arrangement, which we illustrate on this page of the present issue. This device seems to possess great merit, and if it performs all that the inventor claims for it, gas managers will become interested in its further development.





He says: One of the many annoyances to be met with in gas management is the frequent inability to impress the men with the necessity of keeping the furnace doors closed when it is not absolutely necessary that they should be open. The cause of this is the negligence of the men in not having their tools for clinkering in a handy position, or their being obliged to carry the coke for firing from a distance, thereby letting in an unnecesaary quantity of cold air, and reducing the heats considerably.

Managers, especially those who take a particular interest in the retort house, must have experienced the difficulty to which I allude; and it will take very little to convince them of the usefulness of an arrangement which does away with a great deal of this trouble and anxiety of mind. By this method, no matter how neglectful the stoker is, not a particle of cold air can pass through the furnace.

In consequence of the heat being thus concentrated, the clinkers remain soft and are easily removed, with a great saving to sides of furnace, saving in time of relighting coke—saving in the prevention of expansion and contraction of retorts, thus lessening the liability of danger from cracking, and finally, in saving the general heat all over the furnace.

The actual saving in coke, on the one bench tried, was over 10 per cent. We go in for high heats, and consider the saving in extra heat, and consequently the relatively higher average per pound of coal to be at least 5 per cent. At present we have not enough benches set with the damper arrangement, to tell the real advantage, so far as the extra percentage is concerned.

To sum up: The savings I claim for my patent are as follows:

1st. The impossibility of the men injuring the retorts through carelessness, in unnecessarily keeping the furnace door open.

2nd. The greater facility afforded for clinkering, and the saving of time during the operation.

3rd. The entire heat being kept in furnace.

4th. The saving of coke.

5th. The absolute constant heat kept on retorts, adding to their life by their freedom from cracking.

Any of the above reasons would entitle the patent to the consideration of managers and superintendents. Their own intelligence will show them that all these facts must follow the simple operation of automatically closing the movable damper in its proper time, by the simple movement of opening the furnace door; and *vice versa*, the shutting of the door opens the damper.

My patent claim does not confine itself to any particular mode of connecting the two; they may be

sliding, raised up or down, or hung on pivots, and connected in any way to suit best: nor does it interfere with the stationary damper set to a particular opening, to suit heats on bench.

I have one in operation where the upright is an old ¾ inch service-pipe, its operation is as follows: Connecting-rod, H, is worked by stud, B, on door; stud A, on door, works rod B, connected on crank C, which is fastened to upright shaft D. On top of upright is another crank E, working contrary to countershaft F; connections from countershaft working movable damper, G, so that the action of opening or shutting door, moves damper in and out; H is the stationary or set damper.

For further particulars, and more complete information concerning the above, address the inventor, Mr. Francis Carroll, New Orleans Gas-Light Company, New Orleans, La.

Gas-Light Association of the United States.

PROCEEDINGS OF THE SECOND SEMI-ANNUAL MEETING OF THE GAS-LIGHT ASSOCIATION OF THE UNITED STATES, HELD IN CLEVELAND MAY 13, 1874.

[Continued from page 207.]

Mr. White—I will say, Mr. President, that the gentleman is merely carrying out in these remarks just exactly what I say—that the pipes from the hydraulic main to the condenser must be kept at an even or gradually lowering temperature. Clegg says that the length of such a main should be ten feet for every inch of diameter you have in the hydraulic main. I find such a rule to work well enough in practice, and recommend it.

Mr. Littlehales—I have had some little experience in naphthaline, and my experience is precisely the same as the gentleman whose paper was first read, and the gentleman in the corner (Mr. White) as to the cause of it; but there is one little discrepancy, as it appears to me, in the gentleman's statement. He says that high heats are the cause of naphthaline—he also says that he cannot get the heats too high to suit him, and yet he argues that we should try to prevent the formation of naphthaline. Two things it seems to me are diametrically in opposition to each other. If a high heat is the cause of naphthaline then let us have lower heats.

Mr. White—I was combatting that theory, sir.

Mr. Littlehales—I believe it was Dr. Letheby who called the attention of the British Association to the fact that tar had a great affinity for naphthaline, and if engineers would only keep the gas long enough in contact with the tar, it would remove the naphthaline from the gas.

I believe that has been tried and been found to be a perfect success in every case. We once had a great difficulty with naphthaline. The cause was this: We were working at exceedingly high heats, and the condensing power was very inefficient. The engineer of the company, Mr. Cathels, had put up not much less than three or four hundred feet of pipe round the retort-house, following that was a battery condenser, which differed from anything I have seen yet in this country. It was constructed of 14 rows, with plates each 4 feet wide, 3 feet deep and 18 feet high, with pipes across it through which the air passed. The advantage of the battery condenser is that the gas comes in contact with the tarry surface, by being tumbled backwards and forwards amongst the pipes in its passage up and down. From the time we had the condenser started we were never troubled with naphthaline. The removal of naphthaline can be entirely and completely effected by keeping it in contact with the tar.

Mr. Walker—I cannot understand this idea of keeping low heats to prevent naphthaline. Low heats will reduce our yield. Our business is to get all the gas, and the best quality we can from the coal—study carefully the combinations formed during the distillation, and apply them to their proper use. Naphthaline being composed of hydrogen and oxygen, is a light-giving substance—not to destroy, but to preserve and utilize. I have never been troubled with any accumulation in my hydraulic main since. Some twenty years ago I adopted the plan of drawing the tar from the bottom. I have found this a complete preventative, and when I want to empty it I just turn down the pipe and let it run perfectly clear.

Mr. Hyde (to Mr. White).—Did I understand you to say that high heats are the cause of naphthaline?

Mr. White—I say that high heats are indirectly the cause; they rendering it possible for it to appear.

Mr. Littlehales—That is to say, although naphthaline is generated, he removes it in the way I suggest. The naphthaline is taken out by the tar.

Mr. Walker—That is my theory of it. Mr. White's idea of the naphthaline question is this: That with high heats we produce it, but with care and chemical knowledge converted it into a permanent gas, increasing our yield, and at the same time preserving a high standard as to quality.

Mr. Nettleton—Mr. President: As I regard it, and as other gentlemen expressed themsevles, high heats are necessary in all cases to generate naphthaline. But my idea of naphthaline is that it is a vapor running along with the gas, and is not a gas itself; and that if you run it along with the other elements of the gas until the gas is properly and gradually cooled, there are certain elements which keep that vapor in contact with the gas, and carried forward with the gas into the holder, and from the holder into the burner and forms an element of light, when the gas is consumed at the burner. I am no chemist, but that is what I understand to be the nature of it.

Mr. Walker—Mr. President: In corroboration of Mr. Nettleton's ideas, I will state that about a year ago I was remodeling an old work; I carried the collecting pipe from the hydraulic main the entire circuit of the retort-house; previous to this change they had been greatly annoyed by naphthaline, but since this change it has entirely disappeared, and as it does not appear to go to the tar well, my theory is the same as that which appeared about nine years ago, in the AMERICAN GAS-LIGHT JOURNAL, over the signature of "Out West," that naphthaline in the form of vapor, by being kept in contact with the highly heated light hydrogen, produced at the latter end of the charge, is converted into a permanent gas.

The President—I do not suppose that it is necessary to say a word, but I suppose that all washing should be deferred until after condensation. Gas should never be washed until after it is condensed (hear, hear), and that it should be condensed slowly, and just as little water should be used as possible.

Mr. White—I look upon the use of water in washing gas very much as the Irishman did upon its presence in his receipt for making punch. He said you first get the lemons and the sugar, and just a sup of water, then plenty of whiskey, then a little more whiskey, then may be a trifle of sugar, and then every drop of water you put in after that is ruination to the punch. (Laughter.)

The Secretary read a paper from Mr. Wm H Grenelle, on the

VACUUM PROCESS.

WILLIAM GIBSON'S COMBINED VALVE AND DIP-PIPE.

Letters patent of the U. S., No. 119,135, September 19, 1872, subject to the generality of United States' Patent No. 95,459, "introducing one or more valves, or cut-offs, at any convenient point between the gas-producing materials in the retort and the liquid contents of the hydraulic main," and of No. 116,450. No. 4,800 and No. 5,771: "providing two out-lets for the gas from the retort, one by a dip-pipe and the other by a free passage capable of being closed by a valve or cut-off": and co-operating with and controlling No. 117,880 "sealing and unsealing the dip-pipe by a mechanical device introduced below the water line in the hydraulic main, combined with an automatic attachment preventing the removal of the lids of retorts until the seal is restored"; also No. 125,043, "combining a number of stand-pipes under one valve"; also No. 144,619, "an improved hydraulic main, that seals and unseals dip-pipes, by raising and lowering the liquid contents of the hydraulic main, without the use of water."

WM. H. GRENELLE, Special Agent,
42 Pine street, Room 18, New York City.

GIBSON'S PROCESS, preventing the formation of hard carbon in the retorts, by relieving them from pressure during the manufacture of illuminating gas, and controlling and regulating the production of gas from ordinary caking coals, at a fixed standard of illuminating power, has been applied during the past six months to the Cambridge Gas Works at Cambridgeport, Mass: at Peoples Works, Brooklyn, New York, and at Peoples' Works, Albany, New York, with satisfactory results.

The record at the new gas works at Cambridgeport, Mass., is, of course more advantageous to the valves, than that of less modern gas apparatus, and therefore these works are not quoted, except as a reference, for preservation from carbon in the retorts, and for a general statement of yield per pound of coal used, and cubic feet of gas per retort charged.

Gibson's combined valve and dip-pipe was first applied at the People's Works, Brooklyn, N. Y., on the 10th day of November, 1873; the works were altered from dip-pipe seal very gradually, and without any interference in the ordinary working of the retorts, save that a charge was missed during the hour taken to adjust the valve; the facility of application enabling the substitution to be made, without the employment of extra labor. On the 29th November, 1873, four retorts in a bench of fives were fitted with valves, the other left in old dip-pipe seal of 1¼ inch; the retorts were new, 8 feet 6 inches by 12 inches by 20 inches and charged continuously until Feb. 5, 1874 with from 1000 lbs. to 1050 lbs. of Penn or Westmoreland coals to the bench each four hours, until the retort in dip was unable to do its share of the work, from formation of hard carbon, while the others remained free from such accumulation. The only appearance of deposit in the retorts, is a scale slow of formation and easily detached, leaving the retort entirely clean; a specimen of this scale is herewith presented for inspection; its designation by the School of Mines, Columbia College, New York, is "*Papyro-carbon.*"

The design of Gibson's invention is to retain the dip-pipe seal at all times. and to make use of the valve only, when most advantageous to do so; after a retort has been charged, for a moment or two the action of the dip-pipe seal is used, to show that the luting, the joints and the retorts are free from imperfections; then the valve is opened, and the exhauster retained at vacuo on the hydraulic main for the first three hours; during the last hour the illuminating power of the gas in the retort, having fallen below the standard the valve is closed, to enable the production during the last hour to receive the benefit of the dip-pipe seal. When a retort becomes defective during the time of production, the tell-tale in the retort house gives the warning; the imperfect retort can easily be discovered and the remedy applied, without disturbing the production of any other retort.

During December 1873 and January 1874, special comparative tests were made at the People's Works in Brooklyn, N. Y., by experts, for the purpose of ascertaining the actual increase of yield and candle power; the ordinary working during the entire month of February, 1874, was also carefully noted and compared with the production by same benches in February, 1873, under supervision of the same engineer, the average result has been, to demonstrate an actual gain in the comparative make and sales, of more than ten per cent. of equal illuminating power.

At the People's Works at Albany, N. Y., the facility of application was more apparent, two-thirds of the retorts in use having been fitted up in ten consecutive hours. The average yield to date, as compared with the average yield in dip-pipe seal during the past year being more than 9 per cent. in favor of the valves.

When the valves are used to aid in the joint manufacture of coal gas and naphtha, the yield from coal of

fixed gas *can be increased 30 per cent. above the maximum by dip-pipe seal.*

This valve, by preventing the formation of carbon, adds about 10 per cent. per annum to the capacity of production from retort; to this add the increase of yield per pound of coal carbonized, and gas works thus fitted will be enabled to meet an increased demand without addition to plant. Where the works are fully equal to the demand, the gain is represented by the decrease in the coal used, the less number of retorts required, the reduction in labor, and the addition to the life of the retorts,

Mr. Walker—Mr. President: I think members of the association should be notified before hand what papers are to be read, so that they may be prepared to discuss them.

The President—My own judgment is that the reading of a paper is the initial step, and that the subsequent discussion is worth fully as much as the paper itself; and I feel inclined to indulge gentlemen in this course because it seems to draw out all the minute points. I desire to say to the association that Mr. Cruse, a German gentleman—a man of great ability—who has erected within our works, during the last year, in one of our vacant places, an apparatus for manufacturing ammonia from the liquor of our works, has prepared a very fine article, as it seems to me (he submitted it to me for inspection) upon purification, as we are practising it now. I hope Mr. Cruse will have an opportunity to read it to the association.

Mr. White—Mr. President: I move the convention adjourn until tomorrow, at 10 o'clock.

Mr. Hickenlooper—I for one would like to see as much time occupied as possible this evening, for if we adjourn over until tomorrow I fear we shall lose some of our members, and I suggest that Mr. Cruse be invited to read his paper now.

Mr. De Mill read to the convention an invitation from M. A. Hanna, to the members of the association, to join an excursion party on the steamer Havana, at 3 o'clock P. M., Thursday, and moved that the invitation be accepted. (Carried).

A paper was then read on

PURIFICATION.

By Edward F. Cruse, Esq., of Cleveland, Ohio.

The purification of the gas after its condensation and washing, is principally effected by the use of caustic lime or oxide of iron.

The impurities consist of sulphuret of hydrogen, sulphurous acid, bisulphide of carbon, cyanogen and different cyanides, carbonic acid, and ammonia.

Caustic lime, as well as oxide of iron, are very effective agents upon nearly all of these impurities.

The *caustic lime* readily absorbs the sulphur of the sulphuretted hydrogen, forming sulphide of lime, neutralizes the sulphurous and carbonic acid, and forms with the cyanogen, and the cyanides, cyanides of lime. The lime, however, has no effect upon the carbonate of ammonia. But this impurity ought to be removed from the gas, by washing in the scrubber, and only the last traces of it pass over to the purifying boxes, where the moisture of the lime will of course absorb some ammonia, but only very little at best.

The bisulphide of carbon will not be decomposed or absorbed by the lime, but passes through all the purifiers and remains in the gas.

The oxide of iron, as a purifier, will absorb the sulphur of the sulphuretted hydrogen, forming sulphide of iron; will neutralize the sulphurous acids and decompose the different cyanides. The carbonate of ammonia will be decomposed, and the last traces of ammonia are removed from the gas by this purifier. But the oxide of iron has no effect whatever upon the carbonic acid, and, as the lime, none upon the bisulphide of carbon.

The bisulphide of carbon, which forms a considerable impurity of the gas, will not be removed by either of these purifiers, and there exists actually no practical way for removing it. But in those gas works where the ammoniacal liquor is utilized and the water from the hydraulic main used for washing the gas in the scrubber, the bisulphide of carbon is dissolved in the ammoniacal liquor, and does not pass over to the purifying boxes at all.

Comparing the effect of the lime and of the oxide of iron, we find that they are about equally effective upon the sulphides and cyanides in the gas.

The ammonia is not absorbed by the lime, but by the iron, and the carbonic acid is not affected by the iron, but absorbed by the lime, and both are equally uneffective upon the bisulphide of carbon.

The lime, after its power is exhausted, becomes useless, and causes only expense for removing, and trouble on account of its obnoxious smell and poisonous gas which it exhales.

The oxide of iron after being removed from the boxes, undergoes a revivification by the mere exposition to the air, and is soon ready to be used again. The chemical process is simply this. The sulphur from the sulphuret of hydrogen is combined with the iron to sulphide of iron, which is a very changeable compound. If exposed to the air, one third of the sulphur will be set free; and the other two-thirds will be transformed into sulphate of iron, or copperas, merely by the absorption of oxygen from the air.

In this way the exhausted oxide of iron after being exposed to the air and decomposed by the oxygen, is brought back to the boxes as a mixture of oxide of iron and copperas, and it is by the copperas that the ammonia of the gas is absorbed. The sulphuric acid of the copperas forms sulphate of ammonia, and sets the oxide of iron free to absorb sulphur again from the sulphides in the gas.

The purifying power of oxide of iron will last a very long time, and only be limited by the accumulation of sulphur. As said before one-third of the sulphur is set free at every revivification, and this sulphur accumulates in the mass, so that in a very long time it can amount to 60 per cent. of the whole.

Iron and lime are both very good purifiers, but the lime can only be used once, and is thus practically very expensive. The iron can be used over and over again, but does not affect the carbonic acid in the gas, and has, if used alone, another considerable disadvantage. That is, the oxide of iron will not very readily absorb the sulphur from the sulphuret of hydrogen, if the whole mass is not in an alkaline or at least neutral condition.

The copperas is a very unsteady and changeable combination, and there is always great danger that the neutral condition of the mass will be changed into an acid one, and in this way diminish the absorbing power of the oxide of iron for sulphides.

This fact accounts for the very irregular results which are obtained by the use of oxide of iron as a purifier, and has led to the use of the well-known combination of Laming's mass, who first used oxide of iron and caustic lime together.

A very good way to prepare Laming's mixture is this: Take equal weights of caustic lime and sawdust and mix them thoroughly. For this purpose the lime ought to be sifted in order to keep all the lumps back and use only the fine dust. Then put in the same weight as the lime or sawdust, of copperas, dissolved in water, and expose it to the air for at least 24 hours. If the copperas is dissolved in boiling water the whole amount can be mixed at once; if not, it must be done in smaller portions, waiting till the solution is absorbed by the sawdust and lime.

In this way this purifier consists of equal weights each of sawdust, copperas, and lime. After it is mixed the caustic lime will decompose the copperas and form sulphate of lime, the protoxide of iron of the copperas will absorb oxygen from the air, and form a very finely divided mass of oxide of iron. This can be observed by the brown color, which the whole mass assumes.

Copperas needs only one-fifth of its weight of lime for this decomposition. Laming's mass ready for use consists of a mixture of oxide of iron, sulphate of lime, and a large excess of caustic lime.

The gas passing through this mass will give its sulphur to the oxide of iron, the sulphate of lime will absorb the last traces or carbonate of ammonia, forming sulphate of ammonia and carbonate of lime. The caustic lime will absorb the free acids. But the principal effect of the presence of lime is the alkaline or at least neutral condition of the whole mass, without which the absorption of the sulphuret of hydrogen by the oxide cannot take place in a very satisfactory way.

Except, as said before, on the bisulphide of carbon, this mixture of lime, sawdust, and copperas, has an excellent purifying effect upon all the impurities. As long as there is any caustic lime left, this purifier will indeed be the most perfect one; and even if all the caustic lime is turned into sulphate of lime, this sulphate in absorbing the ammonia sets lime free, ready to absorb again the carbonic acid from the ammonia in the gas.

After its use, this mass in its chief elements will consist of sulphide of iron and carbonate of lime Exposed to the air the sulphide of iron will undergo exactly the same reaction as the oxide of iron mentioned before. One-third of its sulphur will be set free, and the rest of it will form the original copperas again, by absorption of oxygen from the air. Now, the *essential point of the presence of lime* is that the carbonate of lime will decompose the copperas, forming sulphate of lime and oxide of iron, which will be in its original condition, very finely divided and very effective upon the sulphuret of hydrogen.

Now, practically, if a suitable iron ore can be bought cheaper than copperas, there is, from a theoretical view, no objection why half of the weight of the copperas could not be substituted by ore or iron borings. In such case a mixture of 33 per cent. of lime, 33 per cent. of sawdust, 16½ per cent. of copperas, and 16½ per cent. of iron ore, would have just as good results

But of course the iron ore is very variable, and its effect depends on the percentage of oxide of iron and of its divided condition.

The most perfect purification of the gas would be obtained by the use of the mixture of lime, sawdust, and iron in the purifying boxes, and the use of a very small quantity of lime, either dry or wet, afterwards, for neutralizing the carbonic acid.

This purifying process, combined with the use of the ammoniacal liquor in the scrubber, for removing the bisulphide of carbon, would furnish the purest gas of the highest illuminating power, which can be manufactured practically, and very cheap.

The thanks of the association were, on motion, tendered to Mr. Cruse, for his able paper on the subject of purification.

Mr. Nettleton—Mr. President: I believe I am appointed chairman of the committee on by-laws. The committee have conferred together, and have come to the conclusion that it would not be best to undertake toprepare a set of by-laws to be reported at this convention, and we have concluded to ask of the convention the liberty of reporting at the next meeting of the association, probably six months hence.

The President—You have heard the request of the committee to have until October to make their report.

Gen. Hickenlooper—Mr. President: I offer the following resolution, and ask that it be referred to the same committee

Resolved, The members shall consist of the Presidents, Vice-Presidents, Secretaries, Treasurers, Engineers and Superintendents of all regularly organized and operative gas companies of the United States, who may become members by assenting to this constitution, and the payment of ten dollars annually.

Mr. Denniston—Mr. President: I would move that the powers of the committee be enlarged so that they may not only prepare a code of by-laws, but revise the constitution.

Gen. Hickenlooper—I accept that modification.

Mr. Buxton—Mr. President: It seems to me that is opening the door. As I understand it now, the members of this convention are such as are sent here by gas companies with authority. It seems to m

that the gas companies should control each of these members; but by that resolution any officer of any gas company is a member of this association by paying $10, whether that gas company wants that officer here or not. My understanding is, that any gas company can delegate three persons and no others.

The President—The proposition is to submit this whole matter to the committee.

Gen. Hickenlooper—Mr. President: I am very glad the gentleman (Mr. Buxton) has said what he has, for his idea is exactly the idea I propose to combat; that is, that it requires the indorsement of a gas company to become a member of this association. I claim the right if not endorsed by that company, to become a member of this association. I claim we are an association for the purpose of becoming educated. I am not the property of any Gas-light Company—they do not claim me as such. I am not getting this education for their benefit, I am getting it for my own benefit. If members have the same understanding in this matter that I have, then it is eminently proper that we should not be endorsed by our gas companies.

Mr. Denniston—I do not represent a gas company here. I was not authorized by a board of directors to come here; but I presume they will be quite willing to pay my expenses if I choose to ask them to do so. I do not hold the same opinion with the gentleman (Gen. Hickenlooper), that I am here only for my own benefit.

Gen. Hickenlooper—Mr. President: I will qualify that statement and say that I am here first for my own benefit, and then for the benefit of my company.

Mr. Denniston—Mr. President: I hope that the constitution may be revised in this respect, for the very purpose of preventing these companies from keeping merely their own men here. If we want to be represented by talent, any person who is engaged in this business should have the privilege of becoming a member. We want their information and knowledge.

Gen. Hickenlooper—Mr. President: Another thing I want to mention. For example—I represent the largest gas company represented here to-day. We are entitled to three persons. Smaller companies for the same purpose only one. Whereas we should pay $30, and smaller companies only $10. We get three times the advantages that smaller companies get, and are three times as large.

The President—My attention has been called to Article 14 of the Constitution on amendments, as follows:

"This constitution may be amended at any annual meeting, provided notice of the same shall have been given, in writing, at the previous annual meeting, or by unanimous consent."

The resolution was referred to the Committee on By-Laws, with instructions to report such changes as it saw fit, subject to the approval of the association.

Mr. Nettleton—Mr. President: I would say that if there are any members who have propositions to amend the constitution, I will be obliged to them if they will submit them now, or send them to me at New York.

Mr. White—Mr. President: I now renew my motion to adjourn until 10 o'clock to-morrow morning.

The President gave an invitation to members of the convention to visit the Cleveland Gas Works in a body, and half-past 8 o'clock, Thursday morning, was fixed upon by general consent to comply with the invitation.

On motion of Mr. Nettleton, the names of F. W. Gates, Henry Thompson, and Thomas Littlehales of Ontario, Canada, were added to the roll.

The convention then adjourned until 10 o'clock, A. M., Thursday.

THURSDAY, MAY 14.

The President—As I anticipated last evening when we adjourned, we are fewer in members this morning than we were yesterday. There may be other members scattered about the city who will yet be here. There are still many matters that might engage our attention, and now what shall be the order of business?

Mr. Nettleton—Mr. President: I would suggest whether it would not be well for the convention to take up the subject of the place for our next meeting, this morning.

The President—That is an important question, and will take some time to dispose of it,

Mr. Steele—Mr. President: Are there no more articles to be read.

The President—I have prepared a short article, on coal, but believing that this closing session would be short, I have left it at home, and cannot therefore read it. The discussions which we had yesterday, after the reading of the several papers, seem to have made a very pleasant impression upon all the members, and if any gentleman wishes to take up any point that was then dropped, a few moments might be spent, very profitably, in that way. But perhaps we ought first to discuss the question of adjournment. Some of the members will be leaving before a great while. The question is—to what place shall we adjourn when we do adjourn? We all know very well the circumstances under which we decided, last October, to come to Cleveland. We then thought it would be necessary to make this a Western Institution. We thought we could not rely upon much co-operation from the East, but we have been pleasantly surprised by the presence of members from the East—some from New England, New York, Brooklyn and New Jersey; and the feeling of many seems to be that we shall succeed in building up an association which shall embrace the whole of the United States and the Canadas, to be called the American Gas-Light Association. We will now take up the question of adjournment. To what place shall we adjourn for the annual meeting, when we do adjourn?

Mr. De Mill—Mr. President: I move that when we do adjourn, we adjourn to meet in the city of New York. I would state that at the last meeting fourteen States were represented by thirty-five delegates, and at this meeting there are eighteen States represented and fifty-five delegates.

Mr. Steele—Mr. President: Have'nt we an invitation to meet at Chicago?

Mr. Walker—Mr. President: If we have no invitation to meet at Chicago I would mention Milwaukie; but as long as Chicago is mentioned it will not do to speak of Milwaukie. I think the idea of going off to one side to the city of New York is simply absurd; for my part I object to going to Chicago on the same account. I think the place of meeting should be more central.

Mr. De Mill—Mr. President: If any member has any other place to suggest he is at liberty to do so; he is not obliged to go to New York. The fact that New York is mentioned does not prevent us from going to Charleston, if we conclude to go there. We had delegates from Florida. We know we have in New Orleans—we might go there. There are many arguments that would influence me to go to some other place, still I am at present in favor of going to New York.

Mr. Spencer—Mr. President: I move to substitute Chicago for New York.

Mr. Nettleton—Mr. President: I suppose it is proper to speak to the whole question, but of all the places that are named, I should rather be confined to the amendment in the discussion. I live in New York and I prefer that the convention should come there. When the meeting was there last fall the gentlemen who came there from the West were very much disappointed. They thought they were received very coldly, and I believe they were. I believe they did not feel any more than they had the right to feel. I think there was a misapprehension on the part of the companies in New York—of the people engaged in the manufacture of gas in the city of New York, not only there but in the surrounding cities. They had very little knowledge of this association, and of the advantages to be gained by it to the country. Now, I want the association to come back to New York city once more. New York is the heart or center of the gas manufacturing interests of the country. Information and intelligence I do not say is greater there than at other places; but there are other considerations in favor of going there. The managers of gas companies throughout the country will sooner or later come there and they will arrange their business so as to come there at the time of this meeting. I want to get the heart right; when you get that healthy, then the institution which grows up around it throughout the country will be healthy too, and after that the meetings of the association can be held anywhere with advantage. So far as I am personally concerned, I shall use my best endeavors to get the city companies in both New York and Brooklyn to join heart and soul and give us their best efforts, best information and judgment, and best results. Another reason why I want the association to come to New York is, I want to have New England with us. New England is a busy hive of gas companies. We were very pleasantly surprised to see gentlemen from New England here—to see Mr. Dwight and Mr. Sherman here. It is a forerunner of what we can get in New England. New York is within distance to draw in all the intelligent and active men of that section of country. I want to bring them in. They can come to New York.

Another thing—it is within reach of our Canadian friends; I want to see them there. I trust we may be able to learn a great deal from them. In connection with this, and as chairman of the committee having the constitution under revision, I will say that I approve of the suggestion made by the chairman (Mr. Price), that the association shall hereafter be known as the Gas-Light Association of America. (Applause.) We want to begin at the heart as I said before, and have that right.

Another thing—if New York shall be decided upon as the place for the next meeting, it will be necessary to have a slight amendment made to the constitution. When that is determined I will bring that amendment forward.

Mr. Sherman—Mr. President: I would move as an amendment to the original motion, and as a compromise of this matter, that we meet at Pittsburgh. Pittsburgh is central and has plenty of Monongahela. (Laughter.)

Mr. White—Mr. President: I would like to urge the original motion to adjourn to meet at New York. Nearly everything that is worth seeing—everything relating to our business is there in perfection. The gentleman suggests Pittsburgh. The monongahela of New York I know to be none behind her's. But aside from that, I think New York offers inducements in a social way that the smaller cities do not afford. There is something there for every man, let his tastes be what they may. It will afford members the opportunity of seeing all the latest improvements of machinery in our line. I know it is considerable of a tax of time and money to gentlemen in the West to come so far, but I think the visit pays them after they get there. I was requested by the president of my company to name our city (Brooklyn) as the place for holding our next meeting, and in doing so I also have his permission to say that we should be very happy to entertain any of the engineers who come there, and to place everything at their disposal to make it pleasant. We should endeavor to do our part in showing them around, and give them all they want to eat in the way of a banquet, and also all the monongahela they want to drink. (Applause.)

Mr. Walker—I do not know why I should be more backward than the rest of you. New York, Chicago, and Pittsburgh have been mentioned. Now, I like Milwaukee. I do not know whether there are any Dutchmen among us, but we have first-rate lager beer (laughter); the best in the country; it is shipped from there all over the country. I move we adjourn to meet at Milwaukee.

Mr. Dunbar—Mr. President: If it is in order I would like to make a motion as an amendment to an amendment, that when this vote is taken it be taken by ballot, and that each member write the name of

the city to which he votes to adjourn, upon the ballot; and I would name the city of Indianapolis as a very proper place. Its location is central, and is large enough to entertain as many gentlemen as will be present on that occasion. I cannot very well speak for the people of Indianapolis, not being a resident there. It is in the State in which I reside, and the association would find many things there of interest. It is a very accomplished western town. The gentleman from New York, I presume is aware of that fact. We come together for the purpose of getting information, and we can do that as well in the West as we can in the East, if our eastern friends will only meet with us.

Mr. McIlhenny—Mr. President: Before the list closes—I do not like to be behind other gentlemen in a matter of courtesy. I would like to suggest another place before the enumeration stops—Washington City. We can show you, perhaps, more in Washington than can be shown in any other city in the Union—a very much improved and beautified city, with the finest streets in the world. You can ride over streets smoother than this floor with grass plats, and fountains, I mean cold water fountains (laughter) all over the city. Then there are the public buildings—various points of interest, as you all know. I suggest that as one of the number.

Mr. Steele—Congress will not be in session in October.

Mr. Dwight—Mr. President; As a place for holding the next meeting of the association I would name Boston. It would give us great gratification to meet you there. We have an association called the New England Association, which has been in existence for some years, and we have received great benefit from it. I met with this association, at its commencement, in New York. There were then difficulties in the constitution that did not meet our ideas. We felt at the time that we could not connect ourselves with the association, that is, we could not go forward and pledge our companies; we could pledge ourselves but not our companies, and for that reason we have never taken a part. But I now find in conversation with the gentlemen who have this in charge, that there will be a change in that respect, and I am very happy to hear of it; and, speaking with reference to the next meeting, of course we would be pleased to see you in Boston, yet I do believe New York is the place under all the circumstances, and I shall exert myself all I can to bring in the New England men. There is a large number of men throughout our states, and very few of them have connected themselves with us. We have a gentleman representing Connecticut here, and four from Massachusetts, still that is a very small number; but if we can have the next meeting at New York, and have all the arrangements as they should be, our New York friends will take hold in a different way from what they did before. I am satisfied that the association would then start off as it should start, and that it would be an association we should all be proud of. It will be the means of gathering information in regard to our business, which we all require and all want, for that reason I sincerely think that New York is the place for our next meeting. (Applause).

Mr. White—Mr. President: I endorse what the gentleman (Mr. Dwight) says. So far as our engineers are concerned. I have taken the trouble to go among them and talk the matter over. The treatment this association received at the hands of the New York engineers last fall, no one more sincerely regrets than myself and that treatment will never be repeated. We shall all be most happy to see you there. We all know that the interests in New York are such as to attract you all; and let our future annual meetings, at least, be always held there. Let New York be the headquarters of the association.

Mr. Spencer—I will waive my preference for Chicago, and be in favor of New York as the place for holding our annual meeting, and I should be very glad if our next semi-annual meeting thereafter should be held at Chicago.

Mr. Nettleton—Mr. President—My idea was to hold our next annual meeting in New York, consolidate the institution, show to the gas engineers of the country that we have something really valuable, and then we can afford to go anywhere, and I thought Chicago would probably be the next place after that.

Mr. Walker—I will withdraw my motion to meet at Milwaukee.

Gen. Hickenlooper—I desire to say that I would be very happy to extend the courtesies of Cincinnati to the association. We have there all the accommodations to be wished for at any place, and, in addition to the rest, we have a hall of our own and a room below that would serve as the place for holding the banquet. While I am personally in favor of New York as the place for holding our next meeting, I hope you will not feel yourselves committed to Chicago for the next meeting thereafter.

Mr. Nettleton—Mr. President: I suggest that the Secretary call the roll, and that each member as his name is called, name the city he prefers.

[All the places mentioned for holding the next meeting were withdrawn except the city of New York].

Mr. Nettleton—Mr. President: I move that all pending motions be laid on the table for the present. Carried.

Mr. Nettleton—Mr. President—I find that Article VIII of the constitution reads in this way: "There shall be an annual meeting of the association to be held on the 3d Wednesday in October of each year, at such place as the annual association may have selected; but such annual meeting shall not be held twice, successively, in the same place, except by a two-thirds vote of the companies represented at such previous meeting; and there shall be also a semi-annual meeting on the second Wednesday in May of each year, at such place as may be designated by the Association." I find then in article XIV—"This constitution may be amended at any annual meeting, provided notice of the same shall be given in writing at the previous annual meeting, or by unanimous consent." I hold that to be the unanimous consent of any meeting of the convention. That being so, I now propose to amend Article VIII of the constitution by striking out in the fourth line of Article VIII, the word "annual." It will then read—"There shall be an annual meeting of the association, to be held on the 3d Wednesday of October in each year, at such place as the association may have selected the previous year; but such meeting shall not be held twice, successively, in the same place, except by a two-thirds vote of the companies represented at such previous meeting."

The President—Do you not want to strike out "the previous year?"

Mr. Nettleton—Yes sir.

Mr. Severance—Mr. President: It seems to me that has reference to the next annual meeting—that the next annual meeting might change this constitution. I object very much indeed to this kind of tampering with the constitution anyhow, and we may be changing it at every meeting if we undertake it in this way. I think the constitution has been sufficiently discussed already. It is now in the hands of a committee for revision, and I have a motion to make which I think will obviate this difficulty, that this association shall adjourn, when it does adjourn, to meet in the city of Brooklyn.

Mr. Spencer—Mr. President: It occurs to me that the language of this article of the constitution has not been properly understood. It seems so to me from the reading of it, where it says the constitution may be amended, at the annual meeting, by notice having been given at the previous annual meeting, by a vote of two-thirds, or by unanimous consent. It occurs to me that the "unanimous consent" refers to the annual meeting. For instance, a motion to amend the constitution is presented at an annual meeting; if you can get the unanimous consent of that meeting, it can be done, otherwise notice must have been given. I think it refers to getting the unanimous consent of the meeting then in session, and you must give notice at the semi-annual meeting, or at the meeting previous, or get the unanimous consent of the annual meeting then in session.

Mr. Nettleton—Mr. President: I think I now have this right by changing a single word. It reads—"such annual meeting shall not be held twice in the same place, except by a two-thirds vote of the companies represented at such previous meeting. Now, I propose to strike out the word "such," and insert the article "a," so that it shall read—"Such annual meeting shall not be held twice, successively, in the same place, except by a two-thirds vote of the companies represented at a previous meeting.

The Pretident—The first question is—whether you can amend the constitution at this meeting?

Mr. Nettleton—I have not the slightest doubt of it. I hold that the words "unanimous consent" mentioned in the constitution has reference to any meeting.

The President—That is an open question.

Gen. Hickenlooper—Mr. President: I trust there will be no effort made to amend the constitution at this meeting. If we commence patching it in this way it will be an interminable job. It is now in the hands of a committee for revision, and if any member has any amendment to offer, it should be referred to that committee. It appears to me from what I have heard of this association, that a new era is about to dawn upon us, a greater interest is manifested in its success than ever before; and, in order to avoid the constitutional difficulty in the way of meeting at New York, let us, as has been suggested, hold our next meeting in Brooklyn. We come then within the bounds of the constitution, and, at the same time, obtain all the advantages that would be enjoyed by holding the meeting in New York.

The President—Is it true that a motion to meet at Brooklyn will overcome the constitutional difficulty?

Several members—Certainly.

Mr. Nettleton—There is no doubt that going to Brooklyn overcomes the constitutional objection.

The motion to meet at New York was withdrawn, and the association decided to hold its next annual meeting at the city of Brooklyn, N. Y.

Mr. Nettleton—Now, Mr. President, there is one more thing that ought to be disposed of, and might as well be done now as at any other time, and that is, the printing of our proceedings, and its supplying of the same to the members of the association and others; and my idea is this, that the secretary of the association be instructed to have the proceedings of the convention, as taken by the reporter, printed in book or pamphlet form, to be supplied to the members of the association, as many copies as they choose, at cost, and to be sold to other parties who may desire, at a certain advance over and above cost; and I now make a motion to that effect, that the secretary of the association be directed to cause the proceedings of this convention to be printed in book or pamphlet form, and supplied to members of the association at cost, as many copies as they see fit to take, and to be supplied to other parties at an additional cost of 25 per cent.

Gen. Hickenlooper—I heartily approve of the motion. I made the same suggestion yesterday, but was met with the statement that an entire report of our proceedings would be published in the GAS-LIGHT JOURNAL, and that that would probably cover the case: but in addition to that, it would be well to have the proceedings published in volume for reference, and I would suggest that as the proceedings will be published in the GAS-LIGHT JOURNAL, they will have the matter set up, and that the committee having the matter in charge could probably obtain from them much more favorable terms.

Mr. Nettleton—Mr. President: I had anticipated that state of things when I made the motion. I had supposed that the GAS-LIGHT JOURNAL would be the parties who would contract to print it at a less price than anybody else could, because they have the facilities to do it. I am aware that the proceedings will be published in the paper, but we want it in book form, so that we will not be compelled to wade through the

columns of a paper to get the proceedings of the convention. I think every member will find that he will save time in looking at the proceedings of the convention by having them in book form, and then let the proceedings of each convention to be held hereafter, be published in the same way, through the succession of years down.

Mr. White—Mr. President: Even as a matter of courtesy, the GAS-LIGHT JOURNAL should have the publication of our proceedings. They have been very liberal in securing a stenographer to take down verbatim all our discussions—have shown a very liberal spirit in all their dealings with the association, and I think this matter should be placed in their hands, a committee being appointed to make arrangements for the publication of our proceedings at as cheap a rate as possible.

The President—With the consent of the association I would ask Mr. Sanderson about how rapidly the proceedings will be published in the GAS-LIGHT JOURNAL.

Mr. Sanderson—Just as fast as possible; about four or five pages each issue.

The President—How long do you think it will take?

Mr. Sanderson—I cannot tell until I get it all from the stenographer.

Gen. Hickenlooper—Mr. President: I desire to make a motion, that a committee consisting of Mr. Nettleton and Capt. White, be appointed to procure the printing of the proceedings of this meeting, with full power to act—leaving the character of the work, the manner of its performance and its appearance, to their discretion and judgment.

Mr. Sanderson—I think the publication in pamphlet form had better be delayed until after their appearance in the Journal, for the reason that there may be some mistakes, which members may desire to have corrected.

Mr. Nettleton—That will delay it too long.

Gen. Hickenlooper—Mr. President: I think it would be very unjust to the GAS-LIGHT JOURNAL for us to publish the proceedings in advance of their appearance in the Journal. I think our interests are identical, and that we could not get along without the aid of the Journal.

Mr. Nettleton—Mr. President: I will withdraw my motion.

Mr. Severance—Mr. President——

Mr. De Mill—Mr. President: I object to this method of proceeding. Motions are made, one after another and not seconded, and it is utterly impossible for me to get a record of them.

Mr. Severance—Mr. President: I beg pardon, but I desire to call Mr. De Mill to order. I have the floor.

Mr. De Mill—Mr. President: My point of order is that there is no question before this body.

The President—On what ground?

Mr. De Mill—On the ground that it has not been reduced to writing and seconded.

The President—There is a motion before the convention, and it has been seconded.

Mr. De Mill—What is the motion?

The President—The motion is that Mr. Nettleton and Mr. White be a committee, with full power, to procure the printing of the proceedings of this convention in pamphlet form.

Mr. De Mill—Who made it?

The President—Gen. Hickenlooper of Cincinnati.

Gen Hickenlooper—Mr. President: I desire to amend the motion and put it in different shape—in connection with the secretary. I realize now, since the secretary has spoken, the utter impracticability of the committee's proceeding without his aid. It was entirely a matter of oversight on my part; the secretary certainly ought to be a member of any such committee.

Mr. De Mill—Mr. President: I did not speak with reference to being named on that committee; but I do speak with reference to the matter of making motions and discussing them by this body, without their being seconded.

The President—The motion was properly seconded.

Mr. De Mill—Mr. President; I have not got it.

The President—No motion is in order unless it is in writing; it is a matter of convenience as well. All resolutions should be reduced to writing.

Mr. Severance—Mr. President: What I was going to say is this, in reference to the connection of the GAS-LIGHT JOURNAL with these proceedings. There are gentlemen here who are probably taking the London *Journal of Gas-Lighting*, and all are aware, of course, that it has come out in double edition, and increased in size, and increased in——

The President—Are you talking to the question?

Mr. Severance—I am, sir. I was saying that the interest shown for the London *Journal of Gas-Lighting* has helped to double its edition; that they print an edition once a week, instead of printing it once in two weeks, and if we can help the GAS-LIGHT JOURNAL in this country, increase it in size and in quantity of reading matter, we are benefitting ourselves, and therefore we should do all we can to sustain it.

Mr. De Mill (Reading the resolution offered by Gen. Hickenlooper)—*Resolved*, That the Secretary, Mr. Nettleton, and Capt. White, be appointed a committee on publication of proceedings of this meeting, with full power to act.

The President—With the consent of the convention, I hope Mr. De Mill will excuse me. I would make a suggestion to Gen. Hickenlooper—that the order of the names be reversed, because Mr. De Mill lives in Detroit, and New York is the place where the printing is to be done—by placing the name of Mr. Nettleton at the head of that committee.

Mr. Severance—I move to insert into the resolution, "and the proceedings of the previous meeting."

Mr. De Mill—I have the record of the proceedings of the meeting in October. I think if these proceedings are to be published they should be published in the way they were in the London *Journal of Gas-Lighting*, published right along consecutively; but I understand the gentleman representing the GAS-LIGHT JOURNAL to say they cannot do that; and if it is broken up into small paragraphs, as proposed, we shall get it sometime about the annual meeting. How soon does the convention expect this resolution to be complied with? How soon will Messrs. Nettleton and White be able to get it printed? I would like to know that.

Mr. Nettleton—All I can say is, the committee, if they have the power, will use their best efforts to get it out at the earliest practicable moment.

Mr. Walker—I understand the gentleman connected with the GAS-LIGHT JOURNAL to say, that there will be several pages of the proceedings printed in each number of the Journal until it is completed. That is exactly the way the London *Journal of Gas-Lighting* does; continued as a story from one number of the Journal to the next.

General Hickenlooper—Mr. President: Another thought has just occurred to me, during this discussion. Gentlemen who desire that the proceedings of this meeting be published, desire no doubt that they be as full as possible, and it occurs to me that it is utterly impossible to do that without reference to the employees of the GAS-LIGHT JOURNAL. Without their assistance, as I understand it, no report of this meeting could be published; therefore it not only devolves upon us as a matter of courtesy and right, but as a matter of absolute necessity, to apply to them, the managers of that Journal.

Mr. Severance—Mr. President: I move that the records of the previous meeting be inserted with the report of the proceedings of this meeting.

Gen. Hickenlooper—Mr. President: I accept the amendment proposed by Mr. Severance, that the proceedings of the previous meeting be published with the proceedings of this meeting.

Mr. Severance—Mr. President: It might be done in this way. Instead of saying "previous meeting," say the records of the association, and then let the committee put in whatever they can find.

The resolution of Gen. Hickenlooper, with the amendment proposed by Mr. Severance, was adopted.

[To be concluded.]

Chemical Repertory.

No. 115.—July 2, 1874.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1149. COMBUSTIBLES OF THE BASIN OF DONETZ AND OF TOULA, RUSSIA.—Scheurer-Kestner and Meunier-Dolfus.—The heat of combustion is much less than the heat of combustion of the elements of these coals, but is considerably above that calculated by Dulong's law. It is concluded again that the elementary analysis of a coal gives no certain guide for the determination of its calorific power.—*Revue Hebdomadaire de Chimie, No. 4, of* 1874.

1150. CHEAP MANUFACTURE OF OXYGEN.—Mr, Mallet manufactures oxygen from the sub-chloride of copper. This salt has the property, when moistened and exposed to the air, of absorbing oxygen, forming an oxychloride. When this is heated, water is first liberated, then the oxygen, and the sub-chloride, in its original condition, is left behind. The process is claimed to be continuous, and one hundred pounds of the material will furnish, it is said, fifty cubic feet of oxygen at each operation.

1151. SUN-POWER.—It is stated that the colossal statue surmounting the dome of the Capitol at Washington, inclines four and a half inches to the west in the forenoon, and the same distance to the east in the afternoon. This fact has been ascertained by fixing a plumb line to the statue and dropping it in the rotunda below. As the morning sun upon the east side of the dome heated the iron and caused an expansion on the side of the statue, it was thrown westward 4½ inches. In the afternoon, when the sun upon the west side heated and expanded that side of the dome, the statue inclined to the east a similar distance.

1152. NITRIFICATION.—Boussingault.—The author has formerly attempted to point out the analogy between a nitre-bed and a manured arable soil. He has now undertaken a series of experiments to determine what share the nitrogen of the atmosphere has in the process of nitrification. The result was that in the nitrification of a vegetable mould, accomplished in a confined and unrenewed portion of stagnant air, the nitrogen of the atmosphere takes no part. The nitrification in such cases takes place at the expense of nitrogenous organic matter.—*Chemical News.*

1153. BLEACHED FROGS.—Did you ever see a white mud turtle, white frogs, white tadpoles, and other unusual amphibious animals bleached out to Anglo-Saxon complexion? asks a Des Moines paper. If not, you can see this curiosity by taking a walk to the paper-mill. The water in which the straw is boiled runs off into a pond connected with the Coon river. All the animals boarding in this pond have had their color changed to a perfect white. They look as if they had been white-washed. This chemical change probably results from the properties in the water, although that is of a yellowish cast, and lighter than the straw boiled in it.

1154. ARTIFICIAL GLYCERINE.—Friedel and Silva found that by transforming propylene, obtained from isopropylic alcohol, into chloriodide and then into chloride of propylene, and treating the chloride with dry chloride of iodine, at 140°, they obtained products containing trichlorhydrine. Separating these products by fractional distillation and saponifying with water the part that boiled between 150° and 160°, they succeeded in obtaining glycerine. There is no difference between glycerine obtained from propylene and that obtained from other sources.—*French Chemical Society.*

1156. SOMETHING TO PONDER.—An average Atlan-

tic steamer consumes fifty tons of coal in twenty-four hours. Therefore, if five tons of coal are sufficient to feed an ordinary grate in our dwellings during the entire year, the coal consumed on board a steamer in one day will last a small family, burning a good fire, 10 years. If a load of coal be left outdoors, exposed to the weather, until it is burned up in one grate, say a month, it loses one-third its heating quality. If a ton of coal is placed on the ground and left there, and another is placed under a shed, the latter loses about 20 per cent. of its heating power, and the former about 47 per cent. The softer the coal the more it loses, because the most volatile and valuable constituents undergo a slow combustion.—*Sci. Press.*

1156. Chemical Engineering.—Gigantic artificial stone masses have recently been manufactured by Mr. B. B. Stoney, Engineer of the British Harbor and Marine Works construction, far exceeding anything attempted elsewhere. They were described in a paper read February 10, before the Institution of Civil Engineers in London. Each block was built up in the open air on a quay, and allowed two or three months' time to consolidate. It was then derricked on to an iron pontoon barge to its destination and lowered to the bottom, its top standing above low water, and its width occupying the whole width of the breakwater. The superstructure was then built on it in the usual manner by tidal work. Thus all expense of coffer dams, pumping, staging, etc., etc., was saved, and great rapidity of construction resulted.

1157. Petroleum Lamps.—In kerosene lamps the light often is unsatisfactory, while all is apparently in good order. It should be borne in mind that, though the wick is but very gradually burned, it is constantly becoming less able to conduct oil. During several weeks some quarts of oil are slowly filtered through the wick, which stops every particle of dust or other matter that will with the utmost care be in the best kinds of oil. The result is that the wick, though it is of sufficient length and looks as good as ever, has its conducting power greatly impaired, as its pores, so to speak, or the minute channels by which the oil reaches the place to be burned, become gradually obstructed. It is often economy to substitute a new wick for an old one, even if that be plenty long enough to serve for some time to come.—*Mining and Scientific Press.*

1158. The Largest Gas Meter in the World.—The Gas Meter Company, Limited, have lately erected, at the Independent Gas-Light Company's Works, Haggerstone, London, a station meter, which is the largest yet made. Its capacity is 150,000 cubic feet of gas per hour, and its measuring drum delivers for each revolution 1,600 cubic feet. The cast iron tank, with its pilasters, cornices, etc., is of the Grecian order and of the following dimensions, namely: 19 feet 8 inches square, and the total height from floor line to the top of pediment is 20 feet 2 inches, and when filled to the working waterline contains 21,000 gallons of water. The inlet and outlet connections are 30 inches diameter. The meter works well at three tenths of an inch pressure.—*Sci. American.*

1159. Atmospheric Dust.—Tissandier.—The quantity of solid matter contained in a cubic metre of Paris air (as measured by a method which the author describes) seems to vary between 6 and 23 milligrams. Thus a mass of air, 5 meters thick, over the Champ de Mars will contain 15 kilogrms. of corpuscles. Where they consisted of *debris* of wood, coal, or the like the length reach sometimes 1-10 m.m.; where of mineral matters, silicon, etc., the diameter varied from 1-100 to 1-1000 m.m. The average weight of sediment falling in 42 hours was 0.002 gr. The chemical composition of the dust was: Organic matters, burning brightly, 25 to 34 per cent.; mineral matters, 75 to 66 per cent. Iron was found in notable quantity, and the author thinks part of it may come from planetary spaces. Lime, silicon, etc., were also recognized. M. Tissandier further analysed some dust, 1 m m. thick, on one of the towers of Notre Dame not visited for years. Its composition well represented that of the aerial corpuscles.—*Chem. News.*

1160. A Coal and Iron Exchange.—The Delaware and Hudson Canal Company has commenced the erection of a new building on the corner of Church and Courtlandt streets, the corner-stone of which was laid at about 11 o'clock yesterday morning. The proceedings were informal. The box placed beneath the corner-stone contained the records and history of the company engraved on copper-plate. After the cap-stone had been lowered to its place Mr. Thomas Dickson, President of the Company, delivered a short address, to the effect that the building was to be used as a coal and iron exchange, and that the company hoped by its erection to materially advance the interests of coal and iron merchants. The architect gives the following as the dimensions of the building: On the Courtlandt street side it extends 143 feet and 10 inches; on the Church street side, 105 feet 6 inches, and will be 122 feet 6 inches in depth. It will be entirely fire-proof, and without iron columns. The ground for the building cost $350,000, and its present estimated cost of erection is said to be about $820,000.

1161. Ammoniacal Gas Refuse as a Remedy for Insects on Trees, Etc.—M. J. Fries has recently addressed a note to the Academy concerning the efficacy of ammoniacal liquor, obtained during the manufacture of coal gas, for destroying insects that attack plants. He says that, having taken some land in 1852 at Munster, in Alsace, which had been left uncultivated for many years, he found that all his first year's planting was devoured and destroyed by myriads of insects of all kinds. The idea struck him of watering the soil abundantly in autumn with ammoniacal gas liquor, diluted with its own volume of water, but strongly charged with tar. The effect was instantaneous and striking: those insects which had sufficient strength left sprang with a bound out of the ground, but died immediately. In subsequent years the plantations were quite restored, and the fruit trees acquired new vigor, partly because of the destruction of the insects but equally so because of the high manurial qualities of the ammoniacal liquor.—*Comptes Rendus.*

1162. Condensation in Steam Cylinders.—By the use of lead facings to pistons and cylinder lids, a considerable economy in the use of steam may be effected. An iron lid and piston will, other things being equal, condense more than three times as much steam as a lead-faced piston and lid. The thickness of metal heated and cooled at each stroke is not considerable, and not far into the metal a zone of constant temperature, lower than that of the steam, will be found. The distance from this zone to the inside of the cylinder will depend on the conducting power of the metal, and will be about 9 for lead to 12 for iron. It may be shown that, in any case, the thickness of the lead acing may be kept within very moderate limits. Other materials may be used for the same purpose, as, for instance, tin, the specific heat of which is 0.562, its specific weight being less than that of iron. Its conducting power is, however, in excess of that of iron, being as 15 is to 12. Slate or hard pottery ware might also be employed, but on the whole the balance of advantage appears to lie with lead.—*The Engineer.*

1163. The Functions and Mechanism of Audition.—In a paper by Prof. A. M. Mayer, to the National Academy of Science, he shows that the significance of the anatomical relations of the parts of the ear is to bring the sound vibrations to act with the greatest advantage on the co-vibrating parts of the ear, and to cause these parts to make one half as many vibrations in a given time as the tympanic or basiolar membranes. This is demonstrated by an extended review of the functions and possibilities of different portions of the auditory apparatus. In the course of this train of argument, Prof. Mayer advances the view that what are known as the hair cell cords, having swellings in the middle of their length which cause them to act like loaded strings, are probably so constituted that each hair cell cord is adapted to co-vibrate with only one special sound, and that a cord in the ductus of the ear will vibrate only half as often in a second as the basiolar membrane to which it is fastened.

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

Cincinnati, Ohio, June 15, 1874.

Mr. Editor: Having seen on various occasions, exhibits of carbonizing accounts (in part) from "model works," I will give a few figures from the book of a young friend of mine, superintendent of an Indiana gas company; first stating that the works are of very old style, and but temporarily enlarged. The benches of threes are of the kind built in 1852 for small irons; arch 5 feet 4½ inches wide. The fives are of his own build (except one, which was in bad condition part of the year, for which average is given).

AVERAGE FOR 1873.

Yield per lb. of coal	4.62 cub. ft.
Purification per bushel lime	7.812 cub. ft.
Quality	15.2 candles.
Leakage and condensation	12.58 per ct.

Month of December, 1873, with six benches of threes, clay, in small arches, and two benches of fives.

Yield per lb. of coal	4.90⅜ cub. ft.
Purification per bushel lime	6.750 cub. ft.
Condensation and leakage	7.06 per cent.
Largest daily make	135,000 cub. ft.
Average daily make	118,000 cub. ft.

Is now making with two benches of fives, and one small one of threes, 64,800 cub. feet in 24 hours; on one occasion, with same apparatus, 77,400 cub. feet. Has for use the coming winter (if needed) five benches of fives and six of threes.

Hoping you may think this worthy of publication,

I am yours respectfully,

Eighth Corporal.

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[Reported Expressly for this Journal.]

July 2, 1874.

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English Caking Coals.			
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Liverpool caking	11 50	@	12 00
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International—At Sydney, $2 50 in gold			— —
Block House—At Mines, $2 12, Gold			0 00
Caledonia—At Mines, $2 00, Gold			0 00
Little Glace Bay—At Mines, 2 00, Gold			— —
Lingan—At Mines, $2 30, Gold			0 00
Reserve (Sydney) $2 25, Gold			0 00

(Duty, 75 cents per ton, gold. Freight to New York $2 50, currency. Cost of above coals delivered in New York, $5 50 @ $6 00, currency.)

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(In New York both the above coals $7 50)			
Shafton	7 50	@	0 00
Youghiogheny	7 75	@	0 00
West Virginia Coals.			
Murphy Run	$7 40	@	0 00
Despard	7 40	@	0 00
West Fairmont	7 40	@	0 00
American Gas Coal	7 40	@	0 00
Fairmont	7 40	@	0 00
Newburgh Orrel	7 40	@	0 00
Pinnickinick	7 40	@	0 00
Cloverhill of Virginia	6 00	@	6 50
McKenzie Compound Mixture			— —
American Cannel Coals.			
Peytons of West Virginia	$12 50	@	00 00
Darlington of Pennsylvania			— —
Cannelton Cannel			12 50
Asphalts.			
Albertite of New Brunswick	$— 00	@	— 00
Ritchie Mineral of West Virginia	18 00	@	at Balt'e.
Trinidad Bitumen	— —	@	14 00

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THURSDAY, JULY 2, 1874.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

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Postal Cards are so extremely popular in this country that, although it is not long since they were introduced, the enormous number of one hundred millions have been printed and issued.—*Scientific American.*

THE CHEMISTRY OF GAS-MAKING.

In our instalment of to-day, of the Proceedings of our American Gas-Light Association, will be found a paper which was thereto presented, on the subject of purification, which, while we are pleased, on the whole, to see it, we cannot let pass without some important exceptions, that we feel obliged to take.

For example, the ancient error is revived that coal-gas contains free sulphuretted hydrogen, whereas, as we have so long ago pointed out in these columns, this cannot exist in the presence of the excess of ammonia that is always present. The sulphur in crude gas is chiefly in the form of sulphide of ammonium. Again, it is asserted that lime, in purifiers, has no effect on the ammonia of the gas, except by virtue of the moisture it contains. Anybody who has witnessed the torrents of ammonia (as sulphide of ammonium) given off by a freshly opened lime-purifier, must reject this notion. In point of fact, as soon as sulphide of calcium is formed in the mass of hydrate of lime, this exerts an affinity—though a weak one—upon the sulphide of ammonium, and a double sulphur-salt is formed. It is also well understood now, as first suggested in 1868 by the present writer, that sulphide of calcium will even take up the bisulphide of carbon, to form a red sulphur-salt, a compound known to Berzelius half a century ago. The author of the paper we refer to does not appear to accept this either.

Nevertheless, the favor with which this paper was received by the association argues at least a recognition, even an appreciation, of gas-chemistry, which we are glad to see, and from which we augur again a progressive tendency in the gas-profession in America. Any essay of this sort, though even devoid of any striking novelty of fact or suggestion, is useful in drawing the attention of our gas engineers to the chemistry of the subject. The next step should be the cultivation of this branch.

INSECTICIDAL.

The scheme of Nature has filled the earth with numerous friends, and innumerable foes, to mankind.

In the constant combat with the latter all-pervading class of beings, human sciences—and especially that of chemistry—must hereafter be brought into play, to a far greater extent than is yet realized by the *profanum vulgus*. No thinking man indeed would deny that, in connection with a more thorough study of the natural history of those most deadly predatory foes—insects—chemistry is competent to cope with them and wholly to defeat them.

This will not be effected, however, by the means now in force. Not to speculate upon what may be possible to future generations, our present object is to point out that we know agents already—and agents attainable without difficulty—whose offensive and defensive aid is nevertheless ignored and neglected. The agents we refer to are among the so-called "waste" products of the gas-works. Naphthaline, phenol, cresol and bisulphide of carbon are eminently among these—substances classed by the gas profession as "nuisances," which to them they now certainly are; whilst by the human race generally they will in future be classed as potent friends and protectors. When we further consider that our gas-works furnish us with these products actually in combination with the most powerful fertilizing agent known to mankind—ammonia—the significance of the reflections here thrown out will not be weakened. In our issue of today (Chemical Excerpt No. 1161) a practical illustration of these truths will be found.

Now, whose business and whose interest is it to rouse attention to these truths among the classes who chiefly suffer? Clearly this duty should justly fall upon those who, by so doing, can convert present causes of loss and annoyance into sources of special profit to themselves, as well as general benefit to mankind; that is, upon the gas profession. Be it our part of this duty to point out to the profession, in future articles, how it should proceed and what measures it should take:—first, to awaken the agricultural classes to the fact, that they will find, in the gas profession an ally whose friendship and co-operation should be encouraged; and next to arrive at the modes of making the by-products of our gas works most rapidly, readily and profitably available to the farmer, in his work of feeding mankind with the fruits of the earth and of eradicating, or keeping under, the destructive enemies that assail those fruits.

To illustrate the inadequacy of the means that are trusted in, up to this time, for dealing with this class of questions; we may here add that through the New York *Tribune* we learn what is reported as the conclusion of the United States Agricultural Department, as the way in which "the prevention of the ravages" of the insects that infest the potato and the cotton plants "can only be accomplished," which is by "the application of Paris green or arsenic"! This horrible *mineral* poison, one of the most implacable and destructive enemies of *all life*, which is already disseminated—through the cupidity of some and the stupidity of others—far more widely over the earth's surface than it should be, it is here deliberately, authoritatively, and officially recommended, shall be broadcast over our fields, and made to communicate its deadly taint even to the sweet winds of Heaven. It is true that our learned Government Department interposes some slight hints, that the operator should stand "on the windward side of the plant when dusting the poison upon it, and not permit cattle to feed on the foliage!" So far as we know, *this* is the first protest that has appeared against an instance of official "thickheadedness" which appears to us worthy only of the dark ages; and this protest is little likely ever to reach any of the great mass of the people, who all are liable to get the mischievous counsel.

PETROLEUM-DEVELOPMENT ON BOTH THE OCEANS.

We consider it one of our vested duties to keep track of matters relating to petroleum, and to reproduce whatever upon this topic—whose importance is truly national—appears to possess both pith and truth. Being stinted in space, however, those directly interested must pardon great conciseness on our part.

First, as to petroleum-gas, Captain M. H. Butler of Tidioute, who will rank in the future as the *practical* pioneer, the man of deeds, who first infused Promethean fire into what once bid fair to be but a sort of galvanized abortion, has his petroleum gas-works in full blast at Tidioute—at least we are told so in the Titusville *Courier* of May 30. We find there a history of Captain Butler's work. He has introduced "one-foot burners" for the gas, which are said to give sixteen-candle lights. The Reverend Mr. Findlay, the Presbyterian minister, never saw any coal-gas illumination that would compare with it, as it beautifies and beatifies the interior of his

church. Captain Butler's consumers assert that they save money by paying $10 per thousand for the petroleum-gas, simon pure and unmitigated.

In an account that we find in the Pittsburgh *Gazette*, from another eye-witness, the latter says that "Tidioute certainly boasts the finest gas in America," and asks the pertinent question—"is it not remarkable that the oil producers should pay so little attention to a subject of such vast importance to them?"

No smoke is complained of, no soot is found in the pipes, no liquid condensation in the services last winter, *no tar in the drips*, and so forth and so on, at more length than we can follow. The following extract, in addition, must now suffice:

"On the 10th of January last Captain Butler put the gas works into the Suffolk Glass works, at Boston, for melting glass, and no heat ever before used at the works, equals that now made from petroleum gas, as all the glass manufacturers in New England, who have visited the works, will testify."

We do not learn whether or not Captain Butler adopts our view, put forth some time since that petroleum retorts should be *heated with petroleum*.

Working in iron and steel with petroleum, is one of the most pregnant developments. We must not be silent about the experiments of Dr. C. J. Eames, both at Warren R. I., and in Brooklyn. The Providence *Journal* is responsible for the truth of what we here repeat.

The experiments recounted had for object the "balling" of thin wrought iron scraps for making horse-shoes. Whereas a furnace required with coal seven hours to heat up, and made four balls per hour, with Dr. Eames's petroleum flame—which appears to be a species of large blowpipe-flame, of petroleum vapor and air—35 minutes only is needed for the initial heating, and a ball then turned out every ten minutes. The labor is one-third less, no ashes, smoke, dust or sulphur. Twelve gallons of petroleum per hour, and 500 lbs. of anthracite per day for vaporizing the petroleum, is the consumption. The loss of iron is reduced from 25 per cent. to 13. Dr. Eames believes the petroleum flame actually removes sulphur and phosphorus from the metal, which is by no means incredible.

Petroleum is now being tried with more or less success in burning bricks, pottery and lime, making steam in locomotives and fire-engines. The "writing on the wall" we have before referred to, becomes gradually clearer, and *liquid ufel*, for various purposes, is a matter of immediate imminence.

All this seems to be preparing the way for what is soon to happen, away in the land of the setting sun, on the shores of the mighty Pacific. Thence comes to us the busy hum of development. It is now many long years since one of our most distinguished American chemists—the man from whose researches, antedating all others, arose the encouragement and the impulse that led to the amazing Pennsylvanian developments—pronounced, after thorough examination, upon the Californian petroleum prospects, as promising wonders only second to those of the Allegheny Valley. Most strangely, by this view, as all will recollect, he brought upon himself reproaches totally unmerited, unjustifiable, and begotten originally, we believe, of the disappointed avarice and consequent malice of greedy intriguers, who expected to reap a great harvest where they had not sown.

The friends of Professor Silliman may well hope now that the time of vindication of his judgment, which they confidently await, is near at hand. If we are to credit the Los Angeles *Express*, and other journals on the Pacific coast, the populace of this coast will now soon be independent of the rest of the world in respect to liquid combustibles. They claim that it is already matter of demonstration that their mineral oils are equally as abundant, while more easily accessible, as easily refined, and quite as good in quality, as the Pennsylvanian.

THE CHEMICAL CELEBRATION AT NORTHUMBERLAND.

As the Editor of this Journal has the high honor of being one of the Committee of Arrangements of the Chemical Centennial, information of current arrangements will be expected of us. Up to the latest advices, it is announced that Prof. Joseph Henry consents to deliver an Oration appropriate to the occasion; Prof. Sterry Hunt a Review of the Progress of Chemistry during the past century; Prof. B. Silliman a Review of American Contributions to Chemical Science; and other eminent gentlemen not yet designated will participate in the ceremonies.

The Local Committee at Northumberland comprises the more prominent citizens of that place, with some from the neighboring town of Sunbury, with a grandson of Dr. Joseph Priestley, the discoverer of oxygen, who inherits his name, as chairman. Arrangements are proceeding rapidly, and in a few days, will admit of the issue of the formal call and other circulars giving all needed information about everything essential. In our next issue we shall be able no doubt to put the whole case before such of our readers as are interested in chemistry; all of whom, we trust will arrange to appear at Northumberland early on the morning of Friday, July 31st, where they will find all things arranged for their utmost accommodation.

SPECIAL NOTICE—WATER GAS RESEARCHES.

The great space occupied by the Proceedings of the Association, furnishes us a very adequate excuse for the omission of many important matters. Among other things, we are again unable to give a further instalment of the Report on Water Gas Researches, which remains in type, awaiting a chance to edge in. The next issue, we trust, will complete the Association Report, and we shall be able to begin to try to catch the fleeting hours, and so forth.

Williamsburgh Gas-Lighi Company.—At a meeting of the Directors of the Williamsburgh Gas-Light Company recently held at their office, corner of Fourth and South Second streets, Williamsburgh, the following named gentlemen were elected to the Board of Directors: Messrs. Samuel Willets, Robert B. Willets, D. T. Willets, Edward W. Fisk, William Hicks, Joseph B. Thomas and W. J. Price. The election of officers has not yet taken place.

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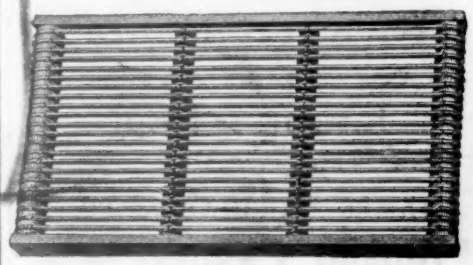

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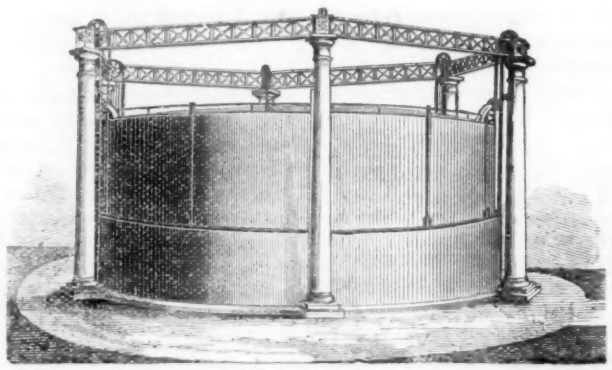

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Prof. WURTZ will also examine and report professionally and geo'ogically upon tracts of Coal Lands.

Private Laboratory and Office,

No. 12 Hudson Terrace, Hoboken, N. J.

(CLOSELY ADJACENT TO THE FERRY HOUSES IN HOBOKEN)

ROBUS, SIMPSON & ROBUS,

(Late of the CRYSTAL PALACE DISTRICT GAS WORKS, London, England, and the NEW CITY GAS WORKS, Montreal, Canada.)

CONTRACTORS FOR

Retort Setting and Fitting, and Main Laying.

☞ Retorts set on what is known as CATHELS'S PLAN FOR SETTING RETORTS.

Retort Setters sent to all parts of Europe and America. Address

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or
F. & H. ROBUS, Bell Green, Lower Sydenham, Kent, England.

FOR SALE.—GASOMETER, 7000 CUBIC FEET CAPACITY, in good order, ready for shipment.

DRY CENTER SEAL, six inch connections.

Four Round PURIFYING BOXES, four feet diameter, six inch connections, no covers or trays.

STATION METER, 30,000 cubic feet capacity, four inch connections. DANIEL BRAYTON, Sup't Gas Works,
357-4t North Bridgewater, Mass.

P.P. DEILY, J. FOWLER.

1842. *1874.*

DEILY & FOWLER,

39 LAUREL STREET, PHILADELPHIA, PA.,

Builders of Gas Works.

MANUFACTURERS OF

GAS-HOLDERS,

Single and Telescopic.

WROUGHT IRON ROOF FRAMES,

COAL WAGONS,

COKE BARROWS,

AND ALL

Wrought Iron Work

CONNECTED WITH GAS WORKS.

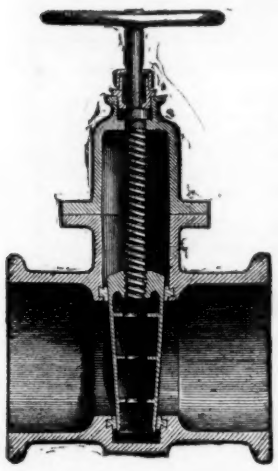
☞ Particular attention paid to Extensions and Repairs.

CHAPMAN VALVE COMPANY.

MANUFACTURERS OF

CHAPMAN GAS VALVES.

Office and Sales Room 75 and 77 Kilby Street, Boston.

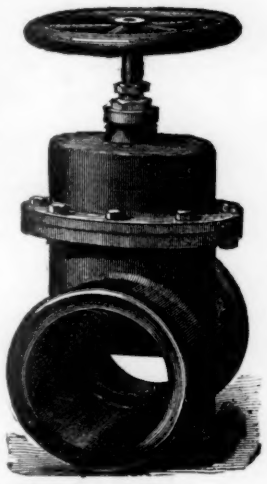


These Valves have been in use for several years, and are pronounced by all who have used them to be

The Best Gas Valves Ever Made.

They afford a direct passage the full size of the pipe. The seats are made of an alloy similar to BABBITT metal, specially prepared for the purpose, and superior to all other metals used for the seats of Gas Valves. It does not corrode under any circumstances to which it is exposed.

There is no LIABILITY OF COHESION between the Gate and Seat, and the Valves can be relied upon to SHUT TIGHE and OPEN EASILY at all times—an important desideratum when used for street mains, in cases of fire.



We refer to the following named Gas-Light Companies among the many that have used these Valves:

BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
CAMBRIDGE GAS-LIGHT COMPANY, CAMBRIDGE, MASS.
NEWTON & WATERTOWN GAS-LIGHT CO., WATERTOWN, MASS.
LAWRENCE GAS-LIGHT COMPANY, LAWRENCE, MASS.
PEOPLES GAS-LIGHT COMPANY, BROOKLYN, N. Y.
CITIZENS GAS-LIGHT COMPANY, BROOKLYN, N. Y.
SOUTH BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
CHARLESTOWN GAS-LIGHT CO., CHARLESTOWN, MASS.
LYNN GAS-LIGHT COMPANY, LYNN, MASS.
FITCHBURG GAS-LIGHT COMPANY, FITCHBURG, MASS.
CITIZENS GAS-LIGHT COMPANY, NEWARK, N. J.
WILLIAMSBURGH GAS-LIGHT CO., WIRLIAMSBURGH, N. Y.

GAS AND WATER VALVES ½ INCH TO 36 INCHES DIAMETER.
STEAM VALVES ½ INCH TO 12 INCHES DIAMETER.
357-tf

CANNELTON COAL COMPANY

Of West Virginia,

Offer to Manufacturers of Gas the pure Cannel Coal from their Colliery at Cannelton, West Virginia. This coal after having been thoroughly tried by the most expert and reliable Engineers, has shown itself to be the most valuable **Enriching agent** produced in this country—a gross ton yielding **10,000** cubic feet of gas, of **64.54** candle power, to purify which, required only two bushels of lime. The yield of coke is **32 bushels** of good quality, quite light, burns freely, making a very hot fire. For further information address

J. TATNALL LEA, Treas.,
P. O. Box 1747. No. 325 Chestnut Street, Phil'a.

PEYTONA CANNEL COAL

From West Virginia.

Yields over **13,000** feet of Gas per ton. At ten thousand feet (standard yield) the illuminating power is over **43** candles. Purifies **4,510** feet to the bushel of lime.

S. E. LOW, Secretary,
354 Office, 58 Broadway.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

Entrance Examinations June 1 and 2, and Sept 23 and 24. For new Catalogue and late Entrance Examination Papers apply to PROF. SAMUEL KNEELAND,
255-12t Secretary, Boston, Mass.

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Steam & Gas Pipe Co.,

PROVIDENCE, R. I.,

BUILDERS OF

Coal and Rosin Gas Works,

FOR TOWNS AND MANUFACTORIES.

Estimates furnished of the cost of Works, and cost to Manufacture Gas in any Locality.

Gasholders,
Iron Truss Retort House Roofs,
Water Tanks,
Purifier Covers,
Coke Barrows,
Cast Iron Socket Pipe.

Particular attention given to Enlarging and Re-building Gas Works.

For Lighting Manufactories, our Rosin Gas Works have been successfully used for *many years* past. They require but a small outlay, and afford a *safe* and *economical* light.

FOR SALE AT MANUFACTURERS PRICES:

EXHAUSTERS AND COMPENSATORS,
IRON AND CLAY RETORTS,
FIRE BRICK, CLAY AND TILE,
ROMAN CEMENT AND ROSIN,
STATION AND CONSUMERS' METERS.

REFER TO

Manufacturers' Gas Co., Fall River, Mass.; Youngstown Ohio, Gas Co.; New Rochelle, N. Y., Gas Co.; Homer and Cortland, N. Y. Gas Co.; Danbury, Conn., Gas Co.; North Bridgewater, Mass., Gas Co.; Cold Spring, N. Y., Gas Co., Rockville, Conn., Gas Co. Taunton, Mass., Gas Co.; Pawtucket, R. I., Gas Co.

FREDERICK GRINNELL, President, J. C. HARTSHORN, Treas,
S. MILLETT THOMPSON, Secretary.

Office and Manufactory, corner of Pine and Eddy Streets, Providence, Rhode Island.
Office in Syracuse, N. Y., No. 1 Granger Block.

H. A. BRANCH, Agent.

AMERICAN

GAS WORKS CONSTRUCTION AND *Supply Company.*

Presldent—JAMES A. TAYLOR, Columbian Iron Works.

Engineer—A. F. HAVENS, late of Brooklyn Ca Light Co., Patentee of the following inventions:

HOISTING ENGINES,
COAL ELEVATORS,
WIRE-ROPE RAILROAD,
TRAYS FOR LIME OR IRON
RETORT CHARGING AND RAKING MACHINE,
RETORT SETTINGS,
SELF-SEALING LIDS,
AUTOMATIC DIP-PIPE SEAL
SECTIONAL PURIFIERS.

The above Patents are the result of many years experience, and are of great value, enabling any Company to increas the capacitv of its Retort and Purifying Apparatus 15 to per cent without change, and at slight cost.

Plans, Specifications, and Details furnished of all Apparatus, and Companies supplied with every thing required in Gas Manufactura, from the greatest to the least, at the lo est market rates.

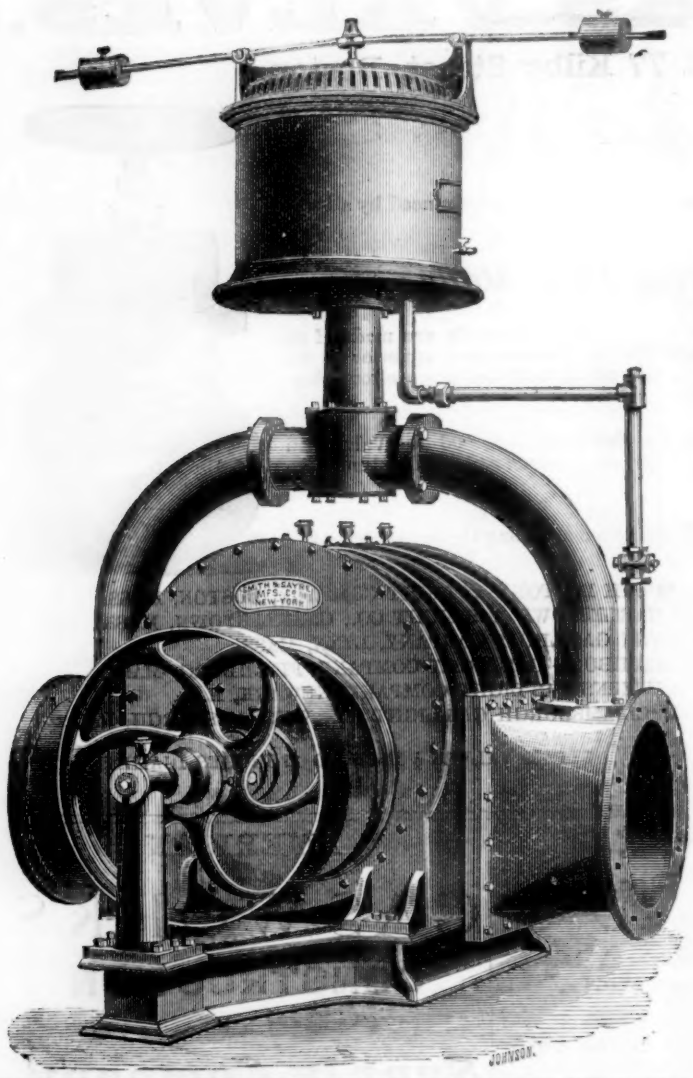
American Gas Works Construction and Supply Company,
No. 61 Broadway.

☞ Mr. HAVENS can be consulted on all matters appertaining to Gas and its manufacture, gratis.

SMITH & SAYRE MANUFACTURING COMPANY.

The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

are also sole proprietors and manufacturers of the

MACKENZIE PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan.

The Cupolas are manufactured in sizes to melt from 1 to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent fuel. Address

G. G. PORTER, President.

JAMES M. SAYRE, Treasurer. OFFICE, 95 LIBERTY STREET, New York.

CHARLES W. ISBELL, Secretary.

AMERICAN

GAS SCREEN MAN'F'G COMPANY.

TO GAS-LIGHT COMPANIES.

Your attention is respectfully called to the GAS SCREEN now being manufactured by the American Gas Screen Manufacturing Company, under the patents granted to E. DUFFEE, and are pleased to submit the following points of their excellence and superiority over all other screens now in use.

The Screen is made with an oak frame, interlaced with split rattan, drawn through holes at regular intervals in the Frame and cross-pieces, the edges of the frame being grooved to prevent abrasion.

The advantages of the screen are:

1st. The large purifying surface, the construction of the Screen giving over three-fourths of the surface for the gas to penetrate the lime.

2d. On account of the free passage of the gas through the screen the pressure is reduced, thereby preventing the accumulating of carbon on the retorts.

3d. The saving of lime and labor, as the Screens are not liable to clog, and are easily cleaned.

4th. Their cheapness and simplicity of construction.

5th. Their DURABILITY—they can be used longer than any other now used.

Testimonials.

PROVIDENCE, RHODE ISLAND, March 21st, 1872

E. DUFFEE, Esq., Agent, etc.

Dear Sir: The Trays manufactured by you for our West Station were put in use in September last, and have *given perfect satisfaction.*

The frames are well put together, and I see no reason why they will not last for a long time. The *very large amount of* open space in these Trays gives the gas an easy passage, and brings it into contact with the lime much better than when the space is so contracted, as is the case in most of the other Trays in use.

The pressure thrown upon the retorts by contracted passages is very great, and were gauges used more frequently than they now are in many gas-works, this facat of having *open Trays* would become more apparent to mangers of gas works. The digerence in pressure at this station in passing the gas through your purifiers, is two-tenths (2-10) inches.

The amount of gas purified, per bushel of lime used to this date, is six thousand five hundred and fifty six (6,556) cubic feet.

Respectfully yours,
JAMES H. ARMINGTON, Supt.

BOSTON GAS-LIGHT CO., Dec. 1871.

Dear Sir: In answer to your inquiry how we like your Patent Tray for dry gas purifiers, I take pleasure in saying we have used them exclusive of all others, for the last three years, and think them far ahead of any yet offered. The surface being nearly three times that of any other Tray, and their lightness and durability perfectly satisfactory.

Yours respedtfully,
A. M. GILES.

EDWARD DUFFEE, Esq.

EAST BOSTON, JUNE 15, 1871.

Gentlemen: We have used your Screens some five years. They give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen. Yours truly, A. M. NORTON, Supt.

CHELSEA, May 1, 1871.

Mr. E. DUFFEE.

We are using your Purifying Trays, and find them to be the *best of any* that I have used, and will *purify more gas with less pressure* than any tray that I know. I can fully recommend them, after four years trial, to any Gas Superintendent with perfect safety, as the *cheapest and best Tray made.*

Yours truly, JOHN ANDREW, Sup't.

DORCHESTER, March 3, 1870.

Mr. E. DUFFEE.

Dear Sir: We have had your Gas Trays in constant use for almost one year and six months and find them superior to any others we have ever used, both in point of economy and efficiency. Truly yours, W. B. BROOKS,
Agent Dorchester Gas-Light Co.

JAMAICA PLAINS, MASS., June 21, 1871.

EDWARD DUFFEE, ESQ.

Dear Sir; The Trays ordered by this company three years ago, are getting somewhat worn. I wish to say here that I consider your Trays to be superior to any yet invented, therefore please make us another set at the price named, to be like the sample shown in every way, and oblige Yours truly
JAMES F. ROGERS,
Sup't Jamaica Plains Gas-Light Co.

BROOKLINE, June 11, 1871.

E. DUFFEE, ESQ.

Dear Sir: You will please make a set of Gas Trays for this company as soon as convenient, at price named. In regard to the merits of the Tray, after having them in constant use for over two years, I will say that I consider them *superior to any Tray* manufactured in this country. Respectfully yours,
H. A. ALLYN,
Sup't Brookline Gas-Light Co.

BANGOR, August 2, 1870

EDWARD DUFFEE, ESQ.

Dear Sir: Yours of the 20th ult. is received. In regard to your Gas Trays, I take pleasure in saying that they have been in use over two years, and have given perfect satisfaction and they are in good order at the present time; should have no hesitation in recommending them, believing they are the most durable and easiest kept in order of any with which I am acquainted. Respectfully yours,
W. H. PERRY, Sup't.

OFFICE OF THE SPRINGFIELD GAS-LIGHT CO.
SPRINGFIELD, MASS., Oct. 10, 1871.

Mr. WARD,
President Hartford Gas-Light Co.

Dear Sir: I have been using Gas Screens made by the American Gas Screen Company, for nearly a year, and find them superior in every way to the wooden Screens made and formerly used by the Springfield Gas-Light Co. I can purify more gas with the same quantity of lime, there being more surface to the Screens; and I consider them more durable, and recommend them to your consideration.

Yours with great respect,
GEORGE DWIGHT

ROXBURY, June 14, 1872.

EDW. DUFFEE, ESQ.

Dear Sir: In answer to your inquiry regarding your Patent Gas Screens, I am happy to be able to say, that after nearly three years constant use we are perfectly satisfied with them being able to purify over fifty pet cent. more gas with them than with any other Screen we have used.

Yours respectfully,
THOMAS J. PISHOU

OFFICE DETROIT GAS-LIGHT CO.,
DETROIT, MICH., April 22, 1872.

AMERICAN GAS SCREEN MANUFACTURING CO., HAVERHILL.

Gentlemen: The Screens bought of you work far better than any we have ever used. As a proof, we have with the same quantity of lime purified *twenty per cent.* more gas with your Screens than with any others, and the work well done. The workmen are also better pleased with them—they being light and handy to work. They also relieve the pressure very much upon the retorts, and I cheerfully give you my experience.

Yours truly,
P. E. DEMILL, Secretary.

We give a list of some Gas-Light Companies using them.

Providence, R. I. Gas-Light Co., Boston, Mass. Gas-Light Co.; East Boston, Mass., Gas-Light Co.; South Boston, Mass. Gas-Light Co.; Springfield, Mass., Gas-Light Co.; New Bedford, Mass., Gas-Light Co.; Manchester, N. H., Gas-Light Co.; Reading, Penn., Gas-Light Co.; Biddeford, Me., Gas-Light Co.; Hartford, Conn., Gas-Light Co.; New Haven, Conn., Gas-Light Co.; New Orleans, La., Gas-Light Co.; Savannah, Ga., Gas-Light Co.; Charleston, S. C., Gas-Light Co.; Trenton, N. J., Gas-Light Co.; Charlestown, Mass., Gas-Light Co.; Dorchester, Mass., Gas-Light Co.; Chelsea, Mass., Gas-Light Co.; Baltimore, Md., Gas-Light Co.; Manhattan, N. Y., Gas-Light Co.; Cincinnati, Ohio.; Gas-Light Co.; San Francisco, Cal., Gas-Light Co.; Albany, N. Y., Gas-Light Co.; Sacramento, Cal.; St. Joseph, Mo., Gas-Light Co.; Leavenworth, Kansas, Gas-Light Co.; Macon, Ga., Gas-Light Co.; Roxbury, Mass., Gas-Light Co.; Lansinghburg, N. Y., Gas-Light Co.; Bridgeport, Conn., Gas-Light Co.; Stamford, Conn., Gas-Light Co.; Poughkeepsie, N. Y., Gas-Light Co; Scranton, Penn., Gas-Light Co.; Lewiston, Me., Gas-Light Co., and one hundred others.

Address **R. A. POTTER, Treas.,**
Amer. Gas Screen Man'f'g Co., Haverhill, Mass.

EDWARD DUFFEE, Agent.

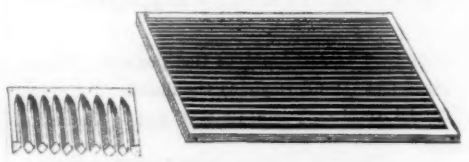
J. L. CHEESMAN.

MANUFACTURER OF

Patent Conically and Diamond Slotted

SOLID WOOD TRAYS.

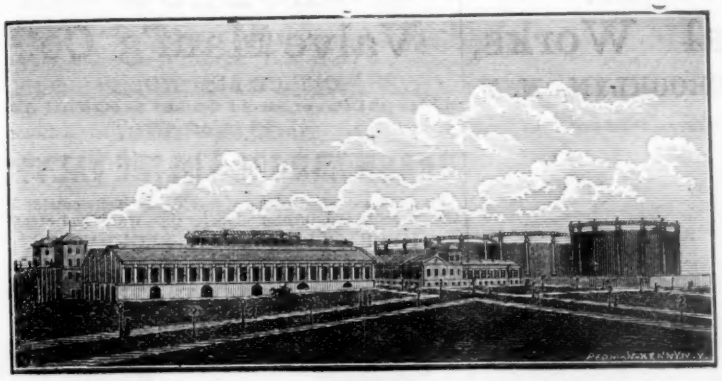
PATENTED OCTOBER 21, 1862 AND JUNE 10, 1873.



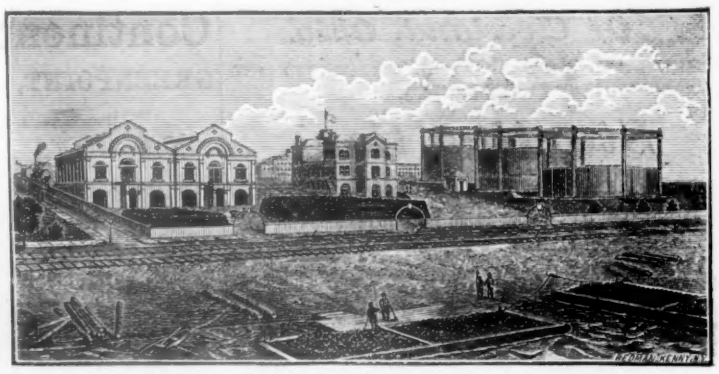
To Gas Companies.

The above Trays will last longer, and are cheaper than any Tray now used. They are now made without any outside strips, which gives more purifying surface, being perfectly smooth. The lime will not adhere to them as in other Trays. They are now used in over three hundred Gas Companies in the United States, and other places.

JOHN L. CHEESMAN,
151 and 153 Avenue C, New York.



CINCINNATI GAS WORKS. ERECTED 1871-72-73.—WM. FARMER, Eng.



LACLEDE GAS WORKS, ERECTED 1872.—WM. FARMER, Eng

WILLIAM FARMER,

ARCHITECT AND GENERAL GAS ENGINEER,

111 BROADWAY, TRINITY BUILDING, Room 95, New York.

WILLIAM FARMER may be consulted upon all matters connected with the construction of GAS WORKS, or any other description of buildings. Will furnish General and Detail Drawings, Specifications and Estimates for Gas Works of any capacity.

PATENTEE OF THE FOLLOWING INVENTIONS:

Exhausters for Gas and Foul Lime Ventilation,
Dumping Barrows for Coal, Coke and Lime,
Hydraulic Mains for Retort Benches,
Blowers for Forges, Foundries, &c.
Pumps for Water, &c., &c.

REFERENCES:

Professor SILLIMAN, New Haven, Conn.
GEN. CHAS. ROOME, President Manhattan Gas-Light Company, N. Y.
A. W. BENSON, President Brooklyn Gas-Light Company, Brooklyn, N. Y.
W. W. SCARBOROUGH, President Cincinnati Gas-Light Company, Cincinnati, Ohio.
S. L. HUSTED, President Laclede Gas-Light Company, St. Louis, Mo.
Prof. HENRY WURTZ, Editor AMERICAN GAS-LIGHT JOURNAL, N. Y.
GEN. A. HICKENLOOPER, Vice-President Cincinnati Gas-Light Co., Cincinnati, Ohio
FREDERICK CROMWELL, Vice-President Laclede Gas-Light Company, St. Louis, Mo.
C. VANDERVOORT SMITH, Engineer Manhattan Gas-Light Company, N. Y.
JAMES R. SMEDBERG, Consulting Engineer, San Francisco Gas-Light Co., Cal. [342

GAS PURIFICATION.

St. John and Cartwright's
NEW IRON COMPOSITION

Has purified, per bushel, on a single test, 10,000 feet of Westmoreland Gas. With revivification lasts indefinitely. Surpasses in POWER and ECONOMY all known materials. Saves largely in FIRST COST, SPACE, LABOR, SUPERINTENDENCE, and all current expenses. Will purify *easily* sulphurous gas, wholly *unmanageable by lime.* Takes out *all the ammonia.* Now operating in the following Gas Works: Harlem, New York (21st street); Port Morris; Hunter's Point; East New York Worcester, Lynn and Cambridge, Mass.; Lewiston, Maine; St, Albans, Vt.; Pawtucket, R. I.; Meriden, Ct.; and being introduced in many other places.

Cost 70 cents per bushel. One bushel for each square foot of Purifier sufficient. Rights to use for life of Patents, for daily makes of gas in thousands; under 25,000 $200; under 50,000, $400; under 100,000, $500; $250 additional for each additional 50,000 per day.

For further information and instructions, apply to
ST. JOHN & CARTWRIGHT,
21st Street and Avenue A, New York Gas Works.

☞ Immediate arrangements are urged, as the demand for the prepared composition is increasing *so rapidly* that delays in supply may occur.

B. S, BENSON.

MANUFACTURER OF

Cast Iron Pipes and Fittings,

AND

Cas and Water Mains.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths

Office & Factory 52 East Monument St.,
BALTIMORE, MD.

OHIO GAS CANNEL,
From the Sterling Colliery.

We are now prepared to place in the market, through our agents as below, a regular and unlimited supply of this valuable Cannel, for gas purposes. The analysis made in 1871 by Prof. WURTZ, Editor of this Journal, at the Laboratories of the NEW YORK GAS-LIGHT COMPANY, gave 47½ per cent of Volatile Matter and 45 bushels to the ton of a fair quality of coke. The yield of gas was at the rate of 9,500 feet per ton of about 27 candle power. It is not highly sulphurous, can be purified by Lime, and the ash from the coke does not clinker. The above test has been fully substantiated as correct, and can confidently recommend trial of the coal.

TUTTLE & GIRTY Proprietors,
Cleveland, Ohio.

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Geo. Merryweather, 52 William St., (Corner Pine) N. Y. Post Office Box, 5115.

GEO. STACEY. HENRY RANSHAW. WM. STACEY.

GEO. STACEY & CO.,

MANUFACTURERS OF SINGLE AND TELESCOPIC

GAS-HOLDERS,

AND ALL KINDS OF

Cast and Wrought Iron Work

Used in the Erection of Gas and Coal Oil Works.

Foundry on MILL STREET; Nos. 33, 35, 37 and 39.
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Indianapolis Gas Co.	Saginaw, Mich., Gas Co.
Dayton, O., Gaslight Co.	Oshkosh, Wis., Gas Co.
Covington, Ky., Gas Co.	Peoria, Ill., Gas Co.
Springfield, O., Gas Co.	Quincy, Ill., Gas Co.
Terre Haute, Ind., Gas Co.	Champaign, Ills., Gas Co.
Madison, Ind., Gas Co.	Carlinville, Ill., Gas Co.
Kansas City, Mo., Gas Co.	Bowling Green, Ky., Gas Co
Topeka, Kansas, Gas Co.	Hamilton, Ohio, Gas Co.
Burlington, Iowa, Gas Co.	Vicksburg, Miss., Gas Co.
Nashville, Tenn., Gas Co.	Denver City, Cal., Gas Co.

R. T. Coverdale, Eng'r Cincinnati, and others.

JESSE W STARR & SONS,

Camden Iron Works

Camden, New Jersey,

MANUFACTURERS OF

ALL KINDS OF CASTINGS AND APPARATUS FOR GAS WORKS,

Wrought Iron Roof Frames,

For Retort and other houses Retorts and all castings required for setting them in the latest and most improved model. WASHERS, CONDENSERS, SCRUBBERS and EXHAUSTERS for relieving the Retorts from pressure. PURIFIERS, varying from 2,000 to 2,000,000 cubic feet daily purifying capacity.

Wrought Iron Lime Sieves,

for Purifiers. Station Meters of all sizes.

GAS HOLDERS,

TELESCOPIC AND SINGLE,

With cast iron guide and suspension frames. GAS GOVERNORS or REGULATORS, STREET MAINS, from 1½ to 48 INCHES DIAMETER, for WATER or GAS. Street Main connections, such as BRANCHES, BENDS, DRIPS, SIEVES, etc.

STOP VALVES, from 3 to 30 inches, for both Water and Gas.

Wrought Iron Work.

All the Smith and Sheet Iron work required in and about Gas Works. 226-tf

JESSE W. STARR. BENJ. A. STARR. BENJ. F. ARCHER

B. E. CHOLLAR,

Gas Engineer,

914 OLIVE STREET, ST. LOUIS, MO.

355-12t

FREEMAN BUTTS,

Of Cleveland, Ohio.

MINER AND SHIPPER OF THE CELEBRATED AND ONLY GENUINE

Sterling Coal,

also dealer in YOUGHIOGHENY, PITTSBURGH, AND AMERICAN CANNEL. Would refer to the following Gas-Light Companies, who have used the HAND PICKED SELECTED COAL:

New York City, Manhattan and New York Companies, Brooklyn, Albany, Troy, West Troy, Rochester, Buffalo, Oswego, Ogdensburgh, Lansingburg, Newburg, Rome, Palmyra, Geneva, Yonkers, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons, in State or New York; Cleveland, Toledo, Sandusky, Norwalk, Oberlin, Salem and Fremont in Ohio; Detroit, Ann Arbor, Grand Rapids, Kalamazoo, Jackson and Adrian, in Michigan; Toronto, Hamilton, and Coburg, in Canada; Chicago, Ill., and two Companies in Milwaukee, Wisconsin.

Letters in reference to Coal should be addressed to the General Office of FREEMAN BUTTS, Cleveland, Ohio. 354

MONONGAHELA

GAS COAL COMP'Y

Of West Virginia.

OFFICE, 56 EXCHANGE PLACE.
(P. O. Box 432.)
BALTIMORE.

Thomas Gemmell, *President.*
A. Robinson, *Vice-President and Treasurer.*
Benjamin Bissell, *Secretary.*

Mines at Wilsonburg, Harrison Co., W. Va.
Shipping Port, Baltimore.

This coal yields of Gas 11,200 cubic feet per ton of 2,240 lbs. and has an Illuminating Power of 16.30 st. candles. 350-3m

TYRCONNELL GAS COAL.,

MINED IN TAYLOR COUNTY, WEST VA.

Company's Office, 52 S. Gay St., Baltimore.
CHARLES MACKALL, Secretary.
CHARLES W. HAYS, Agent, Room 7, 111 B'way, N. Y.
SHIPPING POINT—Baltimore, Md.

This coal yields 10,000 cubic feet of Gas, with an illuminating power of over 16 candles. Forty bushels of very superior Coke, with little Ash, and scarcely any clinker. 304-1y

EVENS & HOWARD,

Manufacturers of a superior quality of

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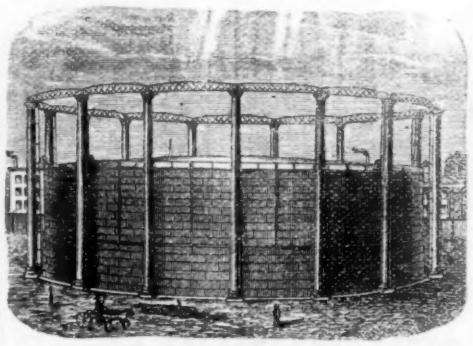

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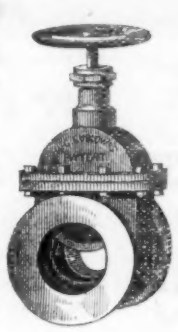

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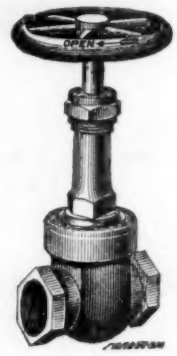

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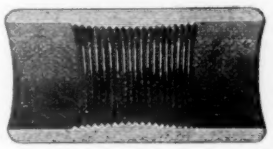

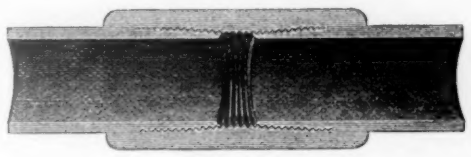

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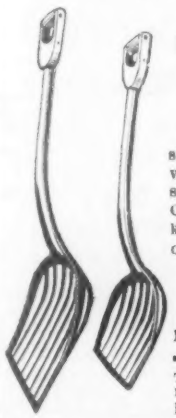

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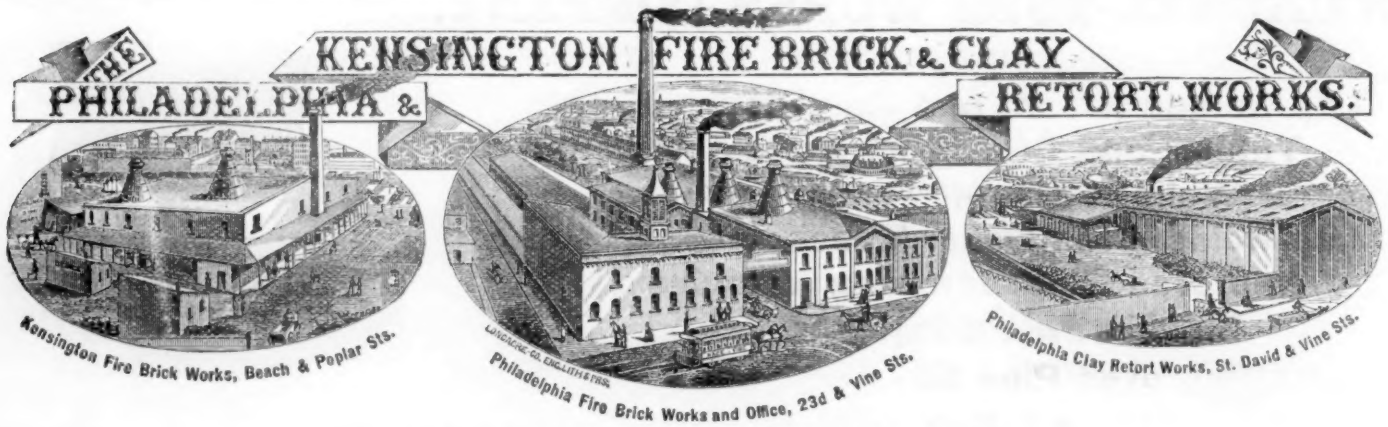
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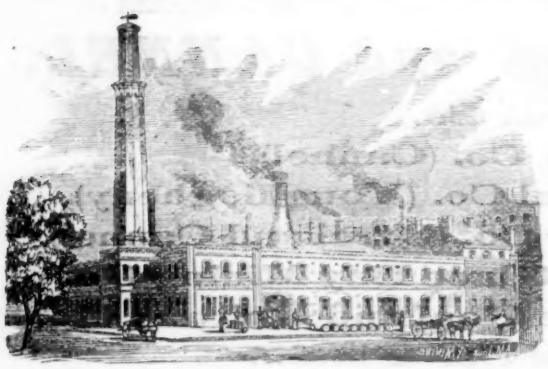

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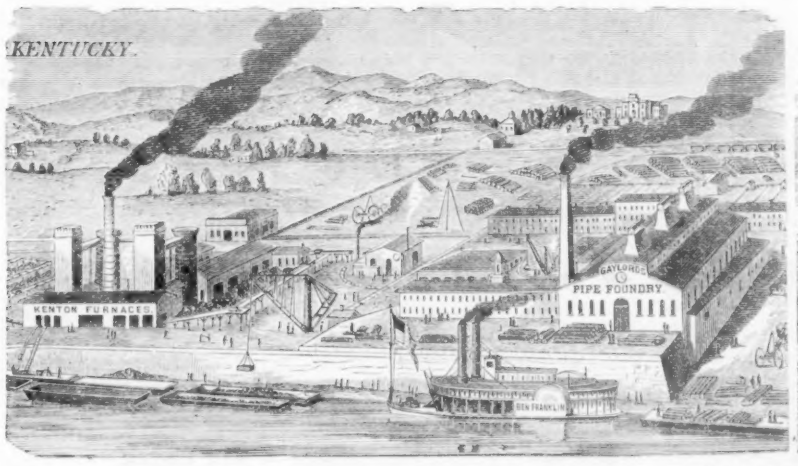

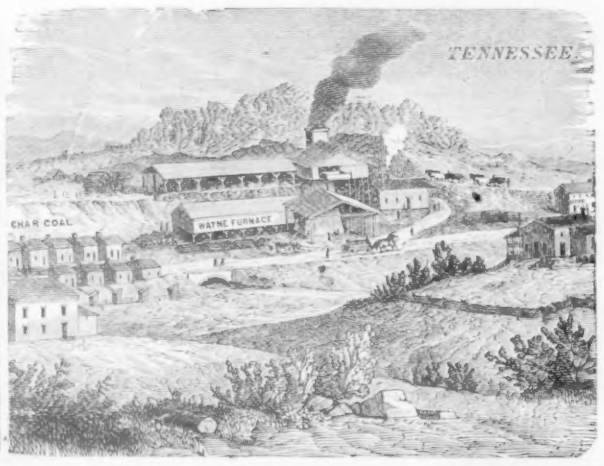

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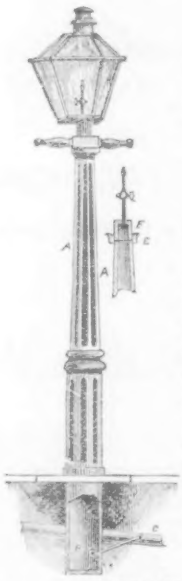

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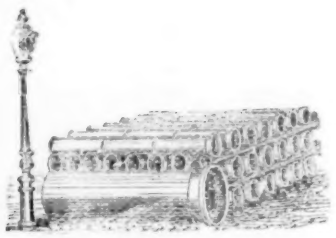

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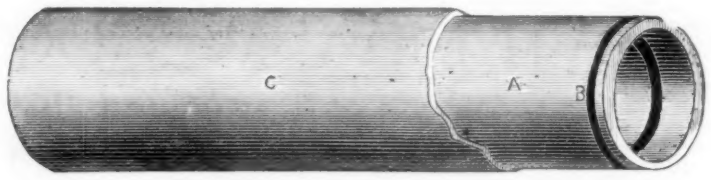

FIG. 2.

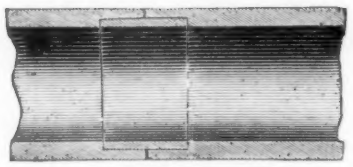

FIG. 3.

A—Cylinder of Wood. **B**—Band of Iron. **C**—Coating of Hydraulic or Asphaltum Cemen

FIG. 2.—Thimble for Connection. FIG. 3.—Horizontal Section and Connection.

Above is a cut of the

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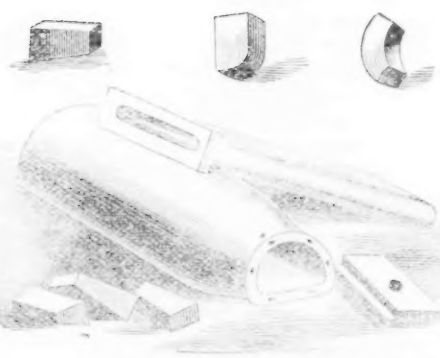

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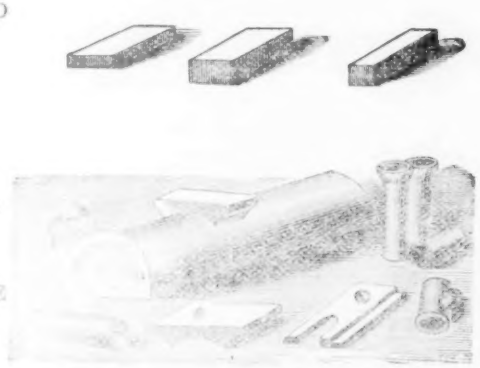

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SCRUBBERS.—Single or Multitubular Scrubbers, with Self-Acting Pumps for Ammonia Water.

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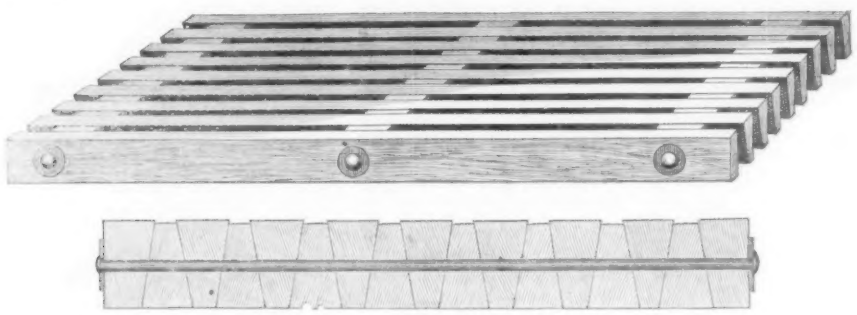

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